The Builder.

VOL. LXXIX., No. 3020. DECEMBER 22, 1900.

ILLUSTRATIONS.

The Nativity: Cartoon for Wall Decoration for a Church.—By Mr. N. H. J. Westlake, F.S.A. ..... *Double Page Ink-Photo.*
Details of Recent Work by Mr. R. S. Lorimer, A.R.I.B.A. ..... *Double Page Ink-Photo.*
Royal Academy Silver Medal for Perspective, 1900: "Centre Portion of Banqueting House, Whitehall."—By Mr. G. T. Smith.. *Double Page Photo-Litho.*
Plan and Elevation of an American Frame House.—Illustrating paper by Mr. H. Budden..... *Double Page Photo-Litho.*

Blocks in Text.

An American Frame House.—Sketches and Plans..... Pages 561-562

CONTENTS.

French Architects and Sculptors of the Eighteenth Century .. 557
Mortar Analysis and the London Building Act, 1894 558
Notes..... 559
An American Frame House 561
The Royal Institute of British Architects 563
The Surveyors' Institution 566
Illustrations:—
The Nativity: Design for Wall-painting for a Church 568
Details of Various Works by Mr. R. S. Lorimer 568
Portion of the Banqueting House, Whitehall 568
Plan and Elevation of an American Frame House 568
Blackburn Police-court and Fire-station Competition 568
Architectural Societies 569
Engineering Societies 569
Competitions..... 569
Working Rules for Bricklayers in the London District 570
The London County Council..... 570
Applications under the 1894 London Building Act 571
Metropolitan Asylums Board..... 572
Books Received 572
Correspondence:—
Royal Academy Architectural Designs..... 572
Old St. Dunstan's-in-the-West 572
The Late Francis Chambers 572
Local Building Societies 572
The Student's Column.—21. Lessons in Electrical Engineering 572
Obituary 573
General Building News 573
Sanitary and Engineering News 575
Foreign 575
Miscellaneous 575
Capital and Labour..... 575
Legal:—
Bad Mortar 576
Crow *v.* the Board of Works for District of Whitechapel .. 576
Recent Patents 576
Meetings 577
Some Recent Sales of Property 577
Prices Current of Materials 577

French Architects and Sculptors of the Eighteenth Century.

THE French architecture of the eighteenth century was, more emphatically perhaps than any other, an architecture of the aristocracy; of palaces and state squares and *places*, and princely mansions, in which the architect had a free hand, almost regardless of expense. In these works there is nothing of the highest grandeur or poetic suggestiveness of architecture; the age was too luxurious and too superficial for that; but there was a passion for stateliness and elegance in all the surroundings of the life of the privileged class to whose tastes and wishes everything else was subordinated, which naturally was reflected in the architecture erected at the bidding of this dominant class.

Whatever we may think, at the present day, of the gigantic and extravagant selfishness of the monarchical *régime* of Louis XIV. and Louis XV., when the middle and lower classes were pillaged with taxes to keep up the magnificence of the King and Court, one must admit that this luxury and display were all in favour of architecture, and that here, as in other epochs, despotism was a better friend to architecture than republicanism. In contradiction to Mark Antony's famous sentiment, the evil which Louis XIV. and XV. did does not live after them, having been purged away in the conflagration of the Revolution, and their benefits remain in a series of stately edifices and *places* and parks which are among the glories of France, however unwarrantably, in a sense, they came into being. Even Versailles, though—as far as the building is concerned—it is not what it might and ought to have been, is a wonderfnl possession, of which the present French Government ought to take much more care than they do; they are allowing the place to lose its finish and stateliness for lack of sufficient provision for its due up-keeping. Bnt in addition to the palaces and their private parks and gardens, nothing is more remarkable or more characteristic of the time than the manner in which the embellishment of cities was undertaken out of sheer devotion to the magnificence of the monarchy. Did Louis XV. condescend to spend a few days in a provincial city, it must needs create in its centre a great ornamental *place*, with its architectural framework and probably its central statue or fountain, in memory of the auspicious event. Patte's folio of illustrations of "Monumens érigés en France à la gloire de Louis XV." brings before one in a collective manner the results of this mania for the architectural illustration of the imaginary greatness of a bad and selfish king. The "Place de Louis XV." now the Place de la Concorde, is the first example, with Gabriel's fine façade along its northern extremity; the square does not differ materially from its present arrangement except for the fountains and the obelisk, the latter now occupying the place where once stood the statue of which, or on which, it was written:

"Les Vertus sont à pied, le Vice est à cheval."

The Rue Royale still runs northward from the centre of the Place, but Constant's Church of the Madeleine, a domed edifice with a fine interior but a cold and conventional façade, as shown in Patte's engraving, has given place to the still more cold and conventional quasi-pagan building of Vignon, intended indeed by Napoleon as a Temple of Glory, though afterwards dedicated to religion. In 1730 was laid out the Place Royale of Bordeaux, from the designs of Gabriel, "architecte du Roi;" then we have the Place Royale of Rennes, the work of Legendre, a "Ponts et Chaussées" engineer, with a fine architectural composition at its upper end forming the back scene for a statue; and the place at Nancy, designed by Héré, with a monumental arch flanked by arcades finely placed at one end of the space, which in every respect is laid out with a remarkable feeling for stateliness of effect.

These memorial *places* in French towns were a special feature of the eighteenth century, belonging, however, rather to its earlier than later years; for after the King, who during his reign had gone through the three stages of being first loved, then feared, and then hated and despised, had arrived at the latter stage, it may be presumed that the taste for spending vast sums on monuments in his honour languished.

There remain monuments enough, however, in the shape of isolated buildings, more familiar mostly than the commemorative squares; many of them household words among architects. Lady Dilke has devoted about one-third of her very handsome volume* to the works of the architects, and given an interesting sketch of the subject, with the advantage that a great many references to books consulted are added in the footnotes, so that they form a kind of running bibliography of the subject. Whether the author has written altogether from personal observation of buildings or from illustrations is rendered rather doubtful by the remark in regard to Gabriel's Ecole Militaire—"Standing as we see it now from the Champ de Mars, in isolated dignity, it is impossible to imagine a more gracious and courtly building." The Ecole Militaire has certainly never been seen from the Champ de Mars since the commencement of 1889, when the Galerie des Machines was completed, so that one must conclude either that the author has been "imagining" a little too much, or that this book has been in hand more than eleven years, in which case, though the volume is a highly ornamental one and the bibliographical notes, as already remarked, very useful, the literary result would seem hardly commensurate with the time expended. The odd point in connexion with this is that the demolition of the Galerie des Machines is at this very moment being debated in Paris for the precise reason that it hides Gabriel's building from view; a motive to be seriously

* "French Architects and Sculptors of the Eighteenth Century." By Lady Dilke. London: George Bell & Sons; 1900.

considered in Paris, though it would be ridiculed in London. One can imagine the spirit in which a proposal to remove the Olympia erection, supposing that it hid some fine building by Hawksmoor or Vanbrugh, would be received here.

Lady Dilke's sketch of the French architectural history of the century, however, though only a sketch, and hardly of special value to architects, shows far more appreciation of distinctions of architectural style and detail than we generally find in the writings of amateurs—especially, we fear we must add, those of lady amateurs. Her sketch has at least the literary value of picturesque and vivid expression; she brings before us the characteristics of the architectural life and spirit of the time, and the relation of the art to the social life of the day. We learn some facts not familiar in regard to the character and life of Servandoni, the architect of St. Sulpice, who, like Inigo Jones, owed a good deal of his reputation with his contemporaries to his talent in contriving temporary shows for festivals, a talent curiouslyin contrast with the severe taste shown in the almost baldly plain front of his great church, impressive nevertheless from its mass and boldness of treatment. The interior might be made fine with a good scheme of decoration; it is woefully bare and cold now, and what little decoration there is is of the most commonplace character. We fully agree with the author in her estimate of that admirable though simple building, the Petit Trianon, which, as we have already remarked,* is the thing best worth seeing among the buildings of Versailles, considered in themselves and apart from the general scheme. The building which is now devoted to the Legion of Honour, but was erected as a private hotel, is another which perhaps even more fully deserves the praise the author bestows on it; the effect of its colonnaded semicircular projection and dome, contrasted with the severely treated rusticated wall on each side, is a perfectly charming piece of architectural creation. When we look at a design such as this, we are led to ask seriously whether, after all, the classic convention in architecture is not the highest or at all events most refined and cultured aspect of the art? Lady Dilke suggests that indirectly the genius of Gabriel may perhaps be thanked for this building, since its architect, Rousseau, was the pupil of Gabriel's assistant, Potain. A considerable proportion of space is devoted to the Panthéon, and it is an interesting detail of architectural history that Patte, the author of the work before referred to, predicted that Soufflot's piers would be found insufficient to carry the dome; a prediction unfortunately realised, in spite of Soufflot's contemptuous indifference to the criticism.

The sculpture, as we have already indicated, is much more fully treated than the architecture, and in this respect the volume is a very valuable résumé of the characteristics of the French sculpture of the period, largely illustrated by many typical examples of the work of Bouchardon, Coustou, Houdon, Pajou, and others. As the author well observes, the feeling for style which distinguishes the sculpture work of the period is due largely to the loyalty with which the sculptors followed the indications given by the architects for whom they worked. "We find," she says, "their work invariably distinguished by the same precision of execution, animated by a nervous and instinctive elegance, and holding that admirably adjusted balance between the real and the ideal which results in absolute clearness of conception. In either case one cannot overlook the skill with which a certain calculated reponse is made to surrounding architectural conditions." Perhaps the characteristic which most strikes one in turning over the collection of illustrations in the volume is the remarkable life and vigour of the treatment, whether in portrait or in ideal figures. There is no classic conventionality in the sculpture of the period; even in a class of subject so trite as Baptiste Lemoyne's "Flore Baigneuse," a nude in the conventional attitude of affected modesty, the head of the figure is not that of a classic nymph with expressionless features; it has almost the individuality of a portrait. A more remarkable nude figure is the Venus by Coustou *fils*, at Potsdam; less individualised it is true, in the head, but characterised by a certain severity of line which is truly sculpturesque. Bouchardon's equestrian statue of Louis XV. is notable for the free and fine design of the pedestal, with its supporting draped female figures at the angles. Houdon's exquisite head of Diana, from the Hermitage collection, is perhaps the most beautiful work illustrated; and though it is more distinctly classic in its *tournure* than most of the works illustrated, it is still not wanting in that reality and intensity of expression which we have mentioned as a characteristic of the French sculpture of the period.

A great deal of interesting information as to the various sculptors mentioned will be found in the volume; but there has been a most unfortunate carelessness in placing the titles of some of the plates. The most important of these have a tissue-paper cover, on which, in accordance with a recent and rather unnecessary fashion, the title is printed, so as to leave the plate itself free from lettering. We presume that circumstances may have prevented the author from seeing herself to the correct distribution of these tissue-paper titles; but the manner in which they have been misplaced in binding shows incredible carelessness and ignorance on the part of those concerned in the make-up of the book. Caffieri's "Portrait of a Danseuse" has the title "Peter the Great," and its proper title is appended to Pajou's bust of Mme. Dubarry; Houdon's well-known seated statue of Voltaire is entitled "Diana, by Houdon"; Lemoyne's nude figure of "Flore Baigneuse" is entitled "Portrait Bust of a Woman," while the title of "Flore Baigneuse" is applied to the equestrian statue of Peter the Great! It is a great pity that a volume generally so finely got up should be disfigured by such absurd and bewildering mistakes; and if this has occurred in all the copies, it ought to be rectified in those still in hand, at whatever trouble or cost.

*"Versailles under the Republic," in the *Builder* of August 26, 1899.

MEMORIAL WINDOW, ST. GILES' CATHEDRAL, EDINBURGH.—The design for the memorial window to Major-General Wauchope to be placed in St. Giles', Edinburgh, has been selected by the committee of contributors. The work is now being executed by Messrs. Ballantine & Gardiner.

MORTAR ANALYSIS AND THE LONDON BUILDING ACT, 1894.

"The mortar to be used must be composed of freshly burned lime and clean sharp sand or grit, without earthy matter, in the proportions of one of lime to three of sand or grit.

The cement to be used must be Portland cement, or other cement of equal quality, to be approved by the District Surveyor, mixed with clean, sharp sand or grit, in the proportion of one of cement to four of sand or grit.

Burnt ballast or broken brick may be substituted for sand or grit, provided such material be properly mixed with lime in a mortar mill."

—By-laws, London Building Act, 1894.

ALL mortar used for building construction in London must conform to the requirements of the foregoing regulations, and it forms part of the duties of the District Surveyors to see that the provisions of the by-laws are duly observed.

In June, 1896, Messrs. Dibdin and Grimwood, the Chemists to the London County Council, communicated to the Society of Public Analysts a paper upon the analysis of mortar, with special reference to the Building Act by-laws. The authors of the paper say that from the provisions of the by-laws "it will be seen that an analysis of lime mortar or cement mortar, &c., can be conducted with a degree of accuracy sufficient to indicate very slight departures from the prescribed quantities of the materials used. Unfortunately, analyses which have been made from time to time by us have shown distinctly that it is only under exceptional circumstances that mortars which come within these regulations are employed."

On the other hand, district surveyors complain that mortars which from their physical condition are obviously unfit for building purposes are sometimes reported by the analyst to be of the prescribed composition, while mortars which appear to be of satisfactory strength are often condemned by chemical analysis.

The truth is that the vague and indefinite wording of the by-laws has rendered it very difficult, save in extreme cases, to prove that a mortar does not comply with the legal requirements. What, for instance, is the legal definition of the term "earthy matter?" Literally speaking, lime and sand are both forms of earthy matter. Presumably clay and garden mould are the two principal materials which would be prohibited as "earthy matter;" but the use of broken brick, which is but heated clay and sand, is allowed, and garden mould may contain so little clay that it will not greatly raise the apparent proportion of "earthy matter." Thus, a mortar composed of 1 part grey stone lime, 1½ parts broken brick, and 1½ parts sand yielded 9·6 per cent. of earthy matter by the Dibdin and Grimwood test. Subsequently an addional 2 parts of garden mould were mixed in the mortar, and yet the proportion of earthy matter was raised only to 10·6 per cent. The high proportion of "earthy matter" in the original mortar is due to the presence of the broken brick, which is partly decanted off as earthy matter, owing to the fact that the finer portion of it does not fall to the bottom of the vessel containing the solution in which the mortar is agitated in the prescribed time limit of one minute. Yet the use of broken brick is permitted as a substitute for sand.

Again, what is lime? Chemically speaking, lime is oxide of calcium. But builders

are well aware that pure oxide of calcium, technically known as "fat lime," must not be used for mortar manufacture. On the contrary, the lime should be made from an impure limestone containing a comparatively large proportion of earthy matter of a clayey character. It is well known to the builder that, though the sand should be free from clay, a good building lime often contains silicious matter commonly classed as earthy matter. If, then, the lime and sand are made into mortar, how is it possible to prove that any earthy matter which may be present was in the sand and not in the lime, or vice-versâ.

Mr. Hughes' test for soluble silica, published in the *Builder* in 1892, shows that all lime mortars of great strength contain a somewhat large proportion of silicious matter not soluble in hydrochloric acid, but which is a chemically active constituent of the mortar. Mr. Hughes and other workers appear to have overlooked the fact that silicate of alumina, the main constituent of clay, is more or less soluble in hot caustic soda solution, and that, therefore, before regarding the whole of the silicious matter found by Mr. Hughes' test as soluble silica, the soda filtrate must be examined for alumina. But whether the matter found by Mr. Hughes' test be silica or silicate of alumina, the fact remains that silicious matter is always present in much larger proportion in strong than in weak mortars.

Common flint from the chalk is a good example of that form of silica which is not soluble in hydrochloric acid, but which is soluble in caustic soda, and the great strength of old flint rubble walls is probably largely due to the occurrence of a chemical reaction between the lime and the amorphous silica.

To render chemical analysis the great assistance it might be to the District Surveyor, a committee of experienced architects and analysts should be appointed to determine the *minimum* proportions by weight of calcium oxide, of silica soluble in acid, and of silica soluble in alkali, which should be allowed in a mortar, and also the maximum proportion of silicate of alumina. These standard minimum figures should be sufficiently low to prevent interference with the present method of working of any builder manufacturing a mortar which can honestly be regarded as of fair strength.

If subsequently the by-laws relating to the composition of mortars were re-drawn in accordance with the recommendations of this committee, the District Surveyor would have no difficulty in proving his case when reporting adversely on an unsound mortar.

Under the present conditions a bad mortar made with fat lime may be shown by chemical analysis to meet the legal requirements, while another mortar of much better quality might, if analysed by the method adopted by Messrs. Dibdin & Grimwood, be condemned.

We believe that Messrs. Dibdin & Grimwood are correct in stating that a large proportion of the mortar used in London does not comply with the requirements of the by-laws; but under the existing law this is not surprising. In view of the fact that the terms "lime," "sand," and "earthy matter" are applied to substances of varying composition, magistrates are quite justified in not attaching much importance to the chemical analysis of a mortar.

Chemical analysis cannot be used as a substitute for physical tests, but may, nevertheless, be of great utility. It may, for instance, be stated with confidence that no lime or cement mortar should contain less than 9 per cent. of calcium oxide or less than 5 per cent. of silicious matter soluble in alkali, nor should a cement mortar contain less than 2 per cent. of silica soluble in acid. The minimum percentages which should be allowed would probably be higher than those mentioned, but that is a matter which might be determined by a competent committee.

NOTES.

Australian Coal.

MANY proposals have been made during the past few years to utilise Australian coal for the Navy at British coaling stations in the East. Except in a very limited way, however, these suggestions have not been adopted, it having been assumed that no coal was so suitable for steaming purposes as that in our South Wales coalfield. In a great measure that is correct so far as the assumption referred to extra-British coal generally. The brown coals, smoky coals, and others of a highly bituminous character found so largely on the Continent are of little use where a smokeless coal with high calorific properties is wanted. Our Admiralty, therefore, purchases enormous quantities of South Wales coal, not only for home consumption, but for coaling stations almost all over the world; and the quantity purchased increases materially year by year. Foreign Governments have also become enormous buyers of this coal. Add to this the increasing requirements of authorities in populous districts in England, where factories, electric lighting stations, and railway companies are not permitted to discharge large volumes of smoke into the air, and where the factories, &c., have in consequence to use a smokeless coal as far as possible, or make extraordinary provision for consuming the smoke from very smoky coal. The result is that the smokeless steam coal is being mined in South Wales to such an extent as to cause grave fears for our future supply. The remedy suggested is to prohibit the exportation of the coal, but there seems to be no hope of that view being carried into effect, and we should still use at home the bulk of what was raised. We turn to Australia, and we find that the question of the quality of the coal there has of late materially changed. Recent discoveries of coal in Queensland show that within seventy or eighty miles of Rockhampton, the chief town of Central Queensland, there is an immense area containing smokeless coal, and the seams are found to range from 9 ft. up to 15 ft. in thickness. The whole of the area has not, of course, yet been proved, but there can be no doubt of the existence of an enormous coalfield and of the kind of coal wanted. The region is traversed by the Central Railway, and water carriage is close by. Another excellent coal is at the Calilde Creek mine, not far distant from the port of Gladstone, where also the quantity available is enormous. And there are certain New South Wales coals very suitable for steaming purposes. There can be no doubt that if these Australian coals were more systematically called upon to furnish requirements at Aden, along the east coast of Africa, in India, the Straits Settlements, in the China seas, and on the Pacific station, the tension now existing in regard to our supply in Britain would be greatly alleviated.

The Workmen's Compensation Act Again.

LAST week we pointed out how much broader were the views of the House of Lords than the Court of Appeal on the construction of the Workmen's Compensation Act. Another instance is already to hand. The House of Lords has again reversed the Court of Appeal, which decided that where a workman had not been two weeks in an employer's service he could recover nothing, because, since compensation was to be calculated on the average weekly earnings, there was no average, and so no right to compensation. But the Lord Chancellor pointed out that by the Act the workman was granted compensation, and that the rule as to the average earnings was only one means of assessment, and that, therefore, where this means was inapplicable, another must be employed. Often no one can guess what was intended by the unintelligible language of this statute, but there can be no doubt that the House of Lords is acting on the best principle of construction. To limit the right of compensation by a narrow construction is unfair to the workmen who are affected by it, because there can be no question that the main exception to compensation was only to be when a workman had been guilty of gross and wilful negligence. The recent decisions of the House of Lords have thus all tended in the same direction, namely, to give the workman the right to compensation except when he has been grossly and wilfully negligent. The petty refinements of the Court of Appeal have been swept away. This spirit of liberality must necessarily affect the future construction of this Act.

Damage to Buildings by Vibration.

A WELL-KNOWN legal correspondent in the *Times* calls attention to the interesting fact that in the private Act of Parliament by which the Metropolitan Railway was incorporated there was a clause which gave house-owners a right to compensation for damage arising from vibration or similar causes if it occurred within three years from the beginning of the traffic on the railway. And he pertinently asks why such a clause should not be made a part of the general law. We would ask why it was not inserted in the Act by which the Central London Railway was incorporated. But having regard to the Extension of Electric underground railways it certainly seems desirable that there should be some general clauses applicable to all such undertakings which should necessarily and by virtue of this general law form part of the special Act. The new mode of transit should not be made at the loss of a number of house owners. Some inconveniences owners of property must suffer by the course of modern improvement, for which no compensation can be recovered. A residential street may become a trading street and so on, but loss from vibration caused by the working of an underground line is certainly a proper subject of compensation.

Gas *v.* Steam.

THE paper on "Power-gas and Large Gas Engines for Central Stations" by Mr. Humphrey, read to the Institution of Mechanical Engineers on Friday

last week, is a most valuable one. It will give plenty of food for reflection for those engineers who are responsible for the design and erection of large central-power stations for the supply of electricity in bulk. Mr. Humphrey describes specially the power plant laid down at the works of Messrs. Brunner, Mond, & Co., at Winnington, Cheshire. In particular he describes an elaborate test on a combined gas-engine and dynamo which extended over two years. The gas was made by a Mond gas plant which converts cheap coal or slack into a clean gaseous fuel and recovers the ammonia from it. In the test the load was practically continuous, as the electric power was being utilised for electrolytic purposes. On one occasion the engine was run continuously without a single stop for 138 days. The final result of the experiment was that the average thermal efficiency of the gas-engine was 25·1 per cent. The working of this gas-engine is undoubtedly the best on record, and Mr. Humphrey is to be congratulated on his management of it. The fuel cost per unit of electricity generated at the switchboard was less than one-twentieth of a penny—a result which quite eclipses anything hitherto achieved at Niagara or elsewhere. One great advantage of the Mond producer is that no gasholder is required, as it responds immediately to any sudden increase in the demand for gas. At Winnington, for example, over a million cubic feet of gas are consumed per hour by the gas-engines, yet no storage of any kind is required. From each ton of slack the Mond producer is capable of getting 150,000 cubic feet of gas, which is sufficient to develop 2,000 horse-power hours when utilised in a gas-engine. The value of the sulphate of ammonia recovered from each ton of slack is eight shillings, and may be actually greater than the cost of the fuel. Mr. Humphrey brings strong evidence in support of his belief that the power-stations of the future will be run by gas-engines of two or three thousand horse-power which will utilise blast-furnace or producer gas. Numerous appendices are given which record the results of most careful and scientific experiments carried out for Dr. Mond by Mr. Humphrey. They will prove of the greatest value to engineers.

The Chambly Dam Failure.

A PORTION of the Chambly Dam, situated about eighteen miles from Montreal, was entirely washed away after midnight, on November 16. The section demolished was that containing the waste-gates, of which there were fifteen, measuring 6 ft. by 4 ft. each. As no one witnessed the accident, it is not perfectly clear whether the section was overturned, or moved downstream, but the fact is that this part of the structure was completely washed away from the rock upon which it was built, and that the remains were distributed along the bed of the river. Examination of the sectional dimensions of the dam does not suggest a reason for failure, as the height was only 27 ft., whilst the width was 27 ft. at the bottom and 8 ft. at the top. The sloping face in the downstream direction ended in a curve of 9 ft. radius, carried a little above the horizontal tangent to form a water-pocket. As the dam was built of concrete, the possibility of some imperfection in the material or workmanship is at once suggested; but on this point no evidence is at present forthcoming. It is certainly unusual for a dam properly founded on solid rock to slide forward on its base, and the alternative modes of failure are by overturning, or by crushing of the masonry. In connexion with the former of these alternatives, it should be remembered that if water finds its way even in very thin sheets under the foundation, pressure of the masonry will be decreased concurrently with a decrease of stability. In the case of Portland cement mortar, there is reason to believe that hydrostatic pressure may be communicated, almost undiminished, through a layer of such material 1 ft. thick. Looking at the circumstances, so far as they are known, it seems to be a warrantable conclusion that concrete construction is best avoided under such conditions as those stated above.

A Year's Boiler Explosions.

IT is satisfactory to note that the total number of boiler explosions during the year ended June 30, 1900, was less than the average, and particularly that the number of explosions of heating-apparatus boilers was only three. To one or two of these we have already referred in detail, and we need therefore only draw attention to the fact that two out of the three explosions were due to "excessive pressure consequent on freezing of water in the pipes," and that the third was due to the safety-valve being fixed with a stop-valve between it and the boiler. The two explosions due to frost occurred on February 10 and February 12 respectively, and resulted in one person being killed and four injured. Whether the small number of explosions was the result of greater care on the part of attendants, or to the mildness of last winter, we cannot say, but we are inclined to think that the latter is the more probable explanation, and that the next severe winter will show that the lessons of past winters have not yet been taken to heart.

Gas for Heating Bath Water.

ON the 13th inst. an inquest was held at Hammersmith on the body of a lad of fifteen years of age who was found insensible in a small bathroom provided with a gas apparatus of the "Geyser" type for heating the bath water. The jury returned a verdict of "accidental death from carbonic oxide poisoning through an unventilated bathroom in which gas was burnt." We understand that no flue was fitted to the gas-heating arrangement, and that, consequently, all the products of combustion escaped into the room. From the report of the evidence before us, it appears that an expert representing a prominent firm of gas engineers stated in evidence that "this kind of geyser did not want a flue," and that "there would be no fumes." It is quite time that the dissemination of statements of this character became a criminal offence. A gas burner need not, and should not, evolve carbonic oxide, but no burner yet constructed has been able to consume hydrocarbon gases, such as are found in coal gas and carburetted water gas, without evolving carbon dioxide. As carbon dioxide will not support animal life, and is evolved continuously so long as the gas burner is in use, it follows that unless the combustion products are led from the room as rapidly as they are formed, the air of the room must become less and less suitable for respiration. In addition the gas by combustion is ceaselessly withdrawing oxygen from the atmosphere, and for this reason also exerts a prejudicial influence in a badly ventilated room. The man who cannot resist striking a match to detect a gas leak will be always with us, and cannot be protected by legislation; but when a professional gasfitter or representative of a gas company fits a gas heater in a small unventilated room, and assures the householder that the provision of a flue is quite unnecessary, that person is either dangerously and culpably ignorant, or is guilty of a serious moral offence. Bath water may be conveniently and economically heated by gas without any degree of danger, but we advise readers to fit the gas-heating arrangement outside, not inside, the bathroom. Bathrooms are frequently small, and badly ventilated while in use.

Cantor Lectures.

IN his concluding lecture on Monday night, Dr. Fleming gave a résumé of the theory of electric waves and successfully showed many striking and novel experiments to a crowded audience. Our ideas of waves as a rule are got from surface ripples on water, but there are many other kinds, such as gravitational, distortional, and compressional waves. A wave carries energy from one body to another through space. All that we can say with certainty about electric waves is that they propagate electric displacement through space. Dr. Fleming showed experiments with apparatus which was a copy of that used by Hertz and illustrated the difficulties with which the distinguished German physicist had to contend. He also showed a marvellously simple form of apparatus which produced a ray of Hertz waves, and by means of which he was able to demonstrate their properties. When this ray fell on a Branly coherer—a small tube containing nickel filings—then it became a conductor, and a bell in its circuit began to ring. On diverting the ray and tapping the tube it became a non-conductor again, and the bell ceased to ring. With this simple apparatus, which was invented by the lecturer, he was able to show what substances were transparent and what were opaque to these waves. For example, a dry brick was transparent, but a wet brick was opaque. He created some amusement by showing that whilst a block of wood was perfectly transparent to the ray, his own head stopped it absolutely. The human body, although perfectly transparent to magnetic waves, is quite opaque to electric waves. In general, any substance which contains water is opaque to electric waves. By holding his hand in various positions he was able to reflect the electric wave wherever he wished, and he also showed that it could be brought to a focus by means of a lens of paraffin wax. He pointed out how his results showed why wireless telegraphy was successful over water or damp soil, and so frequently failed when tried over arid land, as in South Africa. Damp earth was opaque and reflected the waves, whilst dry earth was quite transparent. In conclusion he said that the electrical engineers of the future must also be ether engineers, for it is in this medium that the energy is transmitted.

The Working Men's College, Great Ormond-street.

AN appeal is made for contributions towards a sum of 4,000*l.* to complete the amount of 8,000*l.* which is needed for the enlarge-

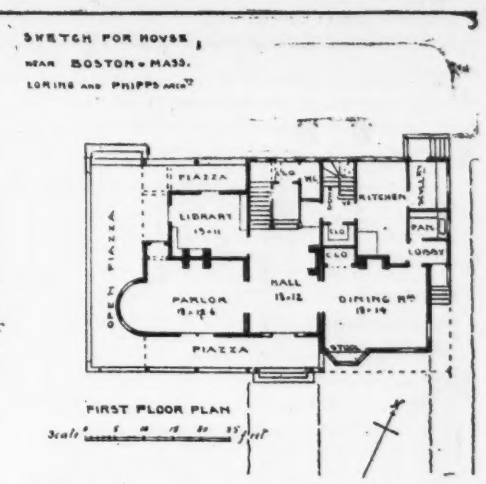

Fig. 1.

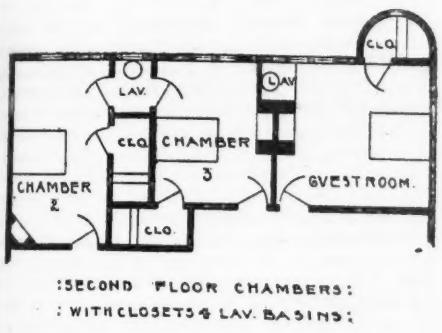

Fig. 4.

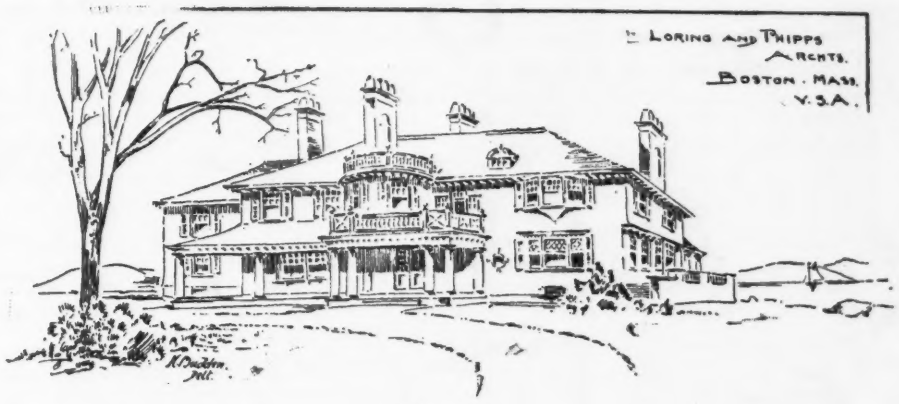

Fig. 2.

ment and reconstruction of the Working Men's College on its present site, as a memorial of the late "Tom" Hughes, who succeeded Maurice in the Principalship. The plans and designs will be prepared by, we understand, Mr. W. D. Caröe. The College was founded in 1854 by the joint efforts of Frederick D. Maurice (the first Principal), Ruskin, Thomas Hughes, J. M. Ludlow, and Charles Kingsley, "to provide instruction for working men at the smallest possible cost in the subjects with which it most concerns English citizens to be acquainted," and to be to them what his college is, or might be, to the University undergraduate. William Morris exerted a warm interest in the aims and well-being of the College, and, together with Rossetti, Burne-Jones, Bowen, Lord Avebury (Sir John Lubbock), Sir John Gorst, and others, took share in the lectures and teaching. The house, lately renumbered 46, is distinguished by its handsome iron railings and contains a fine main staircase; it has been identified with that which Lord Thurlow occupied and whence in the night of March 24, 1784, thieves carried off the Great Seal, having entered from over the wall of the garden that then lay open towards St. Pancras.

AN AMERICAN FRAME HOUSE.

By HARRY BUDDEN, A.R.I.B.A.

IT is a great pity that few English architectural students consider a trip to America at all necessary to their general experience.

I do not propose filling a column or more with a justification of this remark. It would be wasted on those who will disagree with me, whilst to any one who would act upon the suggestion a little practical information would be much more acceptable on what may at first sight appear a far greater undertaking than in reality it is, and it is with a hope of helping in a small way those energetic ones that these notes are given. Assuming—indeed, hoping—that the traveller is dependent on his own efforts, I propose dealing with a subject he will meet very early in his experience, "The Frame House," the most common in any office, and yet as peculiarly American as anything except, perhaps, the steel-framed "sky-scraper," which is not likely to be given to the stranger, for in that the construction and figuring is beyond any but the first-class American draughtsman, who by training is as familiar with this New-World material as the Englishman is with his Old-World stone.

First, as to those you will meet in an American office, I cannot speak too highly of their kindly and friendly assistance, ready always to help a stranger through a difficulty, to explain how something is constructed "here," how this is shown and that is figured; and this spirit is probably responsible for that hearty co-operation which helps the work on. The first thing the stranger will learn—at least nine out of ten will learn—is that he is not so quick a man as he would like to be, and, indeed, soon *must* be, if he would hold his own in an American office. The American works hard and, moreover, he is fast, draws well, is keen on freehand, and will take on any work. The stranger will do well to adopt similar tactics.

Naturally so many differences exist in materials, construction, and methods of drawing and detailing that it would be impossible to enumerate all without making this a glossary of terms, of materials, stock-sizes, &c., but it is believed that the drawings and descriptions following will do much towards this, and as the illustrations have been selected from actual working drawings from various sources they will have a wider scope than otherwise, though it must be remembered that in so large a country differences exist in methods as in manners, and what holds in the East may not altogether be accepted in the West. The method of framing adopted only as far West as Ohio differs from that of the Eastern provinces, but it is generally accepted (especially in those provinces) that the East leads in all matters connected with art, and that Boston is the Mecca of architecture; and, believing that, I adopt the Eastern methods throughout, with an occasional comparison of the Western custom; but the student need never go beyond Chicago for his experience—indeed, not out of Greater New York.

The so-called "Colonial" style is much in vogue now, just as the "later Renaissance" is in England; they are the same precisely; the old houses erected in the early days were modelled on those of England, and possess a simple classic character that would not be unfamiliar to the Englishman here, though we may marvel that so much is wood (indeed, that everything *may* be of wood), and this will account for many modifications and novelties that will be interesting as the outcome of wooden construction. The so-called "American Romanesque" style, I am glad to say, is dead; but one man, its originator, Richardson, ever could design in it, and he succeeded in public buildings rather than domestic, though of course his numerous imitators never thought this any restriction to their efforts. But one is not likely to work again in such a style, and therefore, it is outside of our present study. It would certainly be worth while to study the original "Colonial" works of the East coast, say at Salem, Mass., for a few days, to fully realise what the term means; and this, supplemented by a few visits to works in progress in any good suburb where modern designs in the style are easily found, will add considerably to the information gleaned herefrom.

The preliminary work on a design will probably have been finished and approved before the stranger is put on to help to make the working drawings, but as this differs little from the custom in England it needs no description; $\frac{1}{16}$-in. scale plans are often traced freehand on paper, and mounted, together with one or two perspective views, to show the clients; and he who can make a pretty sketch in colour will meet with approval. Every assistant is able to get one up in pencil or ink, and many more than in England are good water-colour men. Such a preliminary scheme is that for a house near Boston by Messrs. Loring & Phipps (fig. 1), a typical little cottage in a picturesque and inexpensive treatment. The other and larger design (fig. 2), by the same firm, is a good example of the "Colonial" style. And here I would remark that both of these are "framed" houses, so the term will be accepted as a broad one. The excellent design for the Massachusetts State Building at the World's Fair, which many will have become familiar with from illustrations, is the typical colonial design much imitated in the East; it was designed by Messrs. Peabody & Stearns, whose work will be found in every important town, always worth study, and to them I am indebted for much information.

The frame house we take for example is not selected for any special merits of its own in design or arrangement, but because it is a good type and the drawings are complete.

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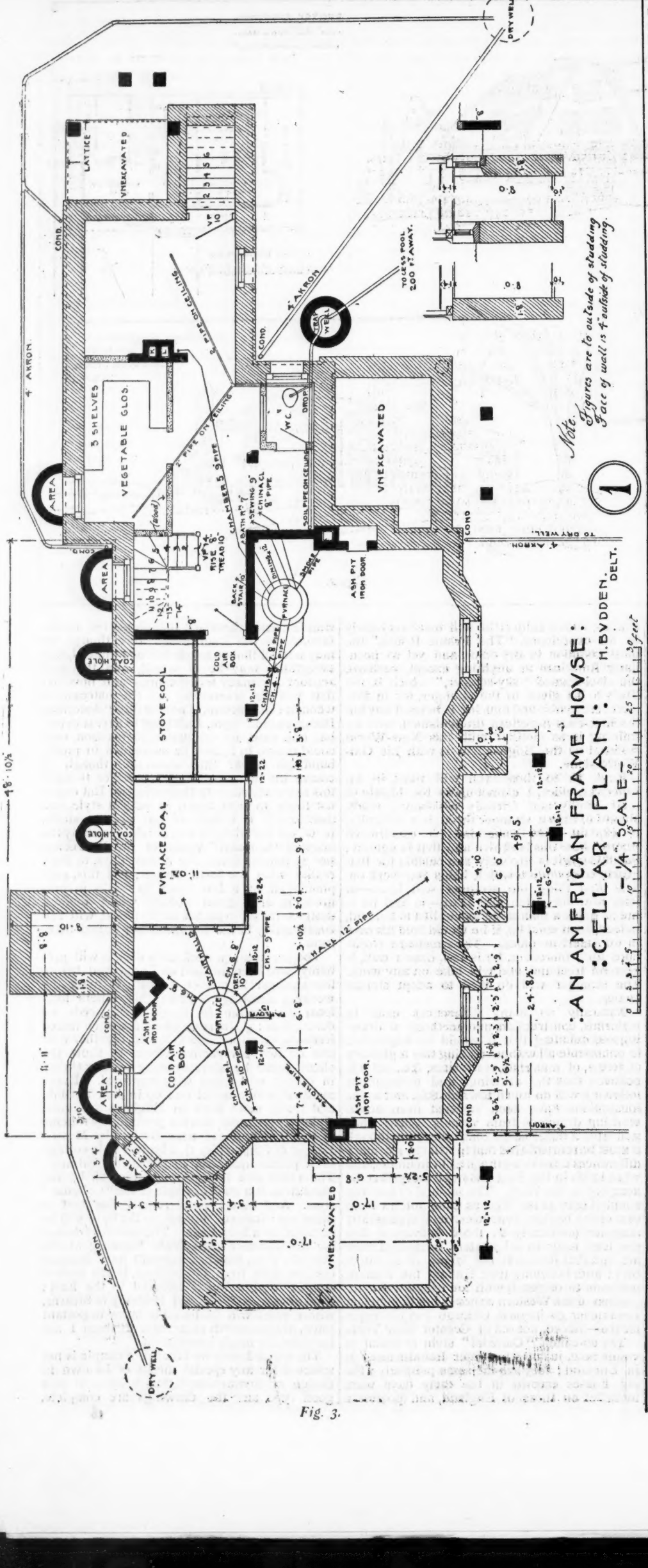

Fig. 3.

One naturally would expect our first example to be executed in wood, but the second and larger one scarcely suggests that material to the "Britisher," and so our example being between the two will, I trust, explain the one and make the other possible.

The "Grade Plan"—our Plan of Levels—will be supplied by a surveyor, and the working drawings must invariably be prepared to ¼ in. scale. Usually they are not intended to be inked in, and so lines are not "run through," but stopped at all returns to make the tracing easier. The system generally adopted is briefly this:—The working drawings are prepared to ¼ in. scale finished in firm pencil, and but sparsely coloured or figured. From these the "frame" drawings are made in ink on tracing cloth and are carefully figured throughout, and at the same time the specification is written, probably by the "construction man." The office copy of working drawings is then traced on cloth from the pencil originals, and these are completely figured up &c., as described hereafter. Sun-copies are made of all, and these are used by the contractors to "bid" upon; the tracings are signed as contract drawings, and the sun-copies are supplied to the builders, the original pencil drawings being put away for reference only, though sometimes signed and stowed with the agreement in the safe. In a large office the draughtsman will not do much of the "figuring," nor will he make the "frame" drawings; his pencil originals will be traced by the juniors and handed to the "construction man" to figure all dimensions, scantlings, and detail notes, &c., which go to make up so complete a set of drawings as those under our consideration now,* but in a small office the draughtsman will have to carry out or help upon all of these processes, and under any circumstances he should know what is expected throughout, and so the whole will be followed in detail now.

The definite outline of the first floor must be laid down first in red ink—here shown dotted (fig. 3)—and remember that "first floor" corresponds to the English ground floor, and "second floor" to the English first floor, and so on. But before the cellar walls can be shown, the detail of water-table or bell-cast of shingles must be decided upon to fix the projection of wall under, and a section is run out adjoining, as shown on our plan. The common projection of 4 in. beyond *face of studs* is taken here, and the 20 in. rubble wall carried round this outline. The footings, of course, will depend upon the nature of the site, though with the usual 20 in. rubble wall a 12 in. course with 6 in. off-set each side is all that is required, and this would be shown dotted on. In this particular instance there are no footings, the bottom being a good hard gravel, and, besides, the weight of a frame house is nothing in comparison to a similar construction in brick or stone. The piers, spaced to accommodate the interior walls of first floor, are often of brick instead of stone, in which case remember the common American brick is only 8 in. by 4 in. by 2⅝ in. In verandahs the shingles or clap boarding may be carried down to "grade," then a section should be set up showing the piers set back plumb with the studs, as instanced under the servants' porch in this example, where lattice filling is adopted between the piers.

The furnace is, perhaps, the most important feature on the cellar plan (see fig. 3); it is generally an iron frame containing a fire-clay box and covered with a sheet-iron air-case rising some 4 in. or 5 in. over the fire. The fresh air box leads from an area to the bottom of this case, and from the crown of it metal air ducts branch and run along the ceilings, to rise at convenient points to the registers in the various rooms, each duct being fitted with a valve to disconnect it at the furnace if desired. The fire draws its supply of air from the cellar. Sometimes hot-water heating is combined with such a furnace by a very simple method, in which case the supply-pipes will be shown in colour leading to the radiators on plan. The rising ducts to the second floor are of tin, of sizes figured for the registers they lead to, all being built in the walls as shown on plan. Our pipes are shown circular, but the square or oblong pipe is in common use, being easier to work

* Mr. Budden sent us the whole set of drawings of an American frame-house, but it was absolutely impossible to find room for them all. We have made a sufficient selection to explain the system.—ED.

into a wall; the joint is a socket and soldered tight.

The drainage of an American house will present many novelties and will repay study as well as any section, for, indeed, improvements on the English methods are sorely needed. We may not take kindly to soil pipes and wastes running down through inside walls, and the pipes being collected within the house, but since all are lead-caulked cast-iron pipes and access is provided to every joint and junction, these objections are minimised, and the great advantage is realised of the security it affords against freezing, a danger greater here than in England. So then the "S. P.'s" will be traced down from the pans above, as also the other wastes, and carried along the cellar ceiling or "drop" under its floor, as most convenient, all to be collected and carried along a small pipe duct to the trap well, or "clean-out" as it is often called, and there ventilated and connected by earthenware pipes (called "Akron," after the place the approved ones are made in), and buried not less than 4 ft. 6 in. below the surface and connected to the drain or cess-pit as may be.

The many fixtures throughout the house require some care as to arrangement of wastes, &c., for the boon of fixtures in bedrooms is realised in America, though in this particular example not taken advantage of, and the conveniences of the system compared to our "wash-hand-stands" cannot be over-estimated; besides, any saving in housework is a consideration in America and soon will be in England. Since this feature is not shown in our example, the accompanying sketch plan (fig. 4) shows a typical arrangement of lavatory and closets between the family chambers, whilst, of course, guest-rooms have a similar convenience in each.

Touching this subject, it may be well to caution the stranger never to show "casing" to any fixture; the Americans know better. The basins are let into marble slabs supported on nickel-plated brackets or standards, and the trap with its vent-pipe, waste are all exposed below, a picture in well-finished nickel-plated brass. Nothing could be more inartistic than a display of English sanitary fittings, whereas the American counterpart would attract all who can appreciate good finish and proportions in a purely utilitarian article. The extra cost over our fittings is considerable, but the compensation comes when furnishing, for no such fitted bedroom requires either washhand-stands nor chest of drawers.

When the other drawings are sufficiently advanced to fix the position of rain-water pipes, these will be shown on the cellar plan and are named "conductors." The drainage system for these will be shown to sewer, street kerb, or dry wells, as provided, or they may be simply finished at "grade" and surface drainage arranged for.

The chimney-stacks are seldom carried down solid, but the pocket utilised as an ashpit, fitted with iron doors, and the flues are usually shown running right down to convey ashes from the fireplaces to this pit, or it is merely gathered over just under the first floor back-hearth, and there a 4-in. or 6-in. opening is provided for those ashes only as fires are seldom lit in the second-floor rooms. "Flue linings" are in common use; these are of ½-in. to ¾-in. fireclay in about 2-ft. lengths, and of brick dimensions inside, 12 in. by 8 in. for ordinary fireplaces, 12 in. by 12 in. for larger ones (kitchen, furnace, &c.), though for these 16 in. by 12 in. are sometimes used. These will be indicated by a double line to flues on plan. A bulkhead must be provided to the cellar with either wide steps or rolling way for convenience in removal of ashes from the pits, &c.; this may be roofed over, though usually folding doors cover the entrance, and are given a slight fall outwards to throw off the water, as in this example. The figuring and printing will be referred to later on when our drawings are supposed to have reached the second stage, that of tracings for sun-copying.

The first and second floor plans—English ground and first—carry 6-in. walls throughout, except where sliding doors or heating flues are to be accommodated. No studs or door and window posts or frames are shown, nor floor joists or trimmers, these all being covered in the frame plans hereafter, and this simplifies our work considerably. To prevent settlements and cracks in plaster the framing is carried round all brickwork of chimneys, &c., and only a narrow breast projected to take the tiles or mantels. The specification provides for 3-in. studs kept 1 in. clear of brickwork, which is cement rendered one coat, so our frame wall should show in all 5½ in. thick round brickwork. A half-brick wall is often considered enough between the flue and the framing, excuse being found in the flue linings, the air space between the two materials, and the cement rendering on all inside brickwork. Should any special posts be required to take girders, support roofs, &c., over cross walls, these are shown on plan and marked "post," as frame drawings of interior walls are not often prepared. Any elaborate cornice or ceiling panelling would be dotted on plan, as is customary with us also.

As to stairs, my experience is that in America the rise may be from ⅜ in. to ½ in. steeper than is generally considered a good proportion in England. Many a flight in their public buildings would surprise an English audience. This may be accounted for by the common use of "elevators" in every kind of building; even a modern three or four-storied town house has its elevator, and then the stairs become of secondary consideration as a means of ascending, though in design it retains its old importance.

Every one knows how complete the closet accommodation in an American house must be to be habitable, and after once proving this convenience the wonder is how a house can be managed without it. Each chamber must have its closet large enough for a set of drawers at least 3 ft. long with shelves over, and for hook-rails on spare wall space; the specification will provide for width and spacing of shelves, hooks, &c., and in the best closets panelled "drop-fronts" to the shelves. Direct light is not required to any chamber-closet, partly on account of the possibility it would make for damp air, but the door should be hung so that it will not block the light when standing open. The back stairs is another feature insisted upon to every house, with doors arranged to lock it off from the main part.

The combined bathroom and water-closet is too common a feature even in first-class houses in America, and cannot be approved, but accepting it excuse may be urged in the good fittings previously referred to, and in the fact that one register serves to prevent freezing in all the fittings, whilst in the better and separate arrangement two would be required. However, it is not our object so much to criticise arrangements as to notice how such are shown on drawings. The first-floor plan usually carries the drives, walks, gates, &c., as these will probably be "called for in bid," that is, taken in the estimate. Many suburban houses have neither gate nor fence to road, nor, indeed, between adjoining properties.

The heating flues, soil pipes, posts, &c., previously mentioned, will be followed through each plan and shown, as also the registers if these are in the floor. The custom in some offices is to have them in the walls just above "base," that is, skirting, in which case the position will be indicated and the size figured.

(To be continued.)

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

SOME TENDENCIES OF THE MODERN SCHOOL OF ARCHITECTURE.

AN ordinary meeting of the Royal Institute of British Architects was held at 9, Conduit-street, on Monday evening. Mr. W. Emerson (the President) being in the chair.

Mr. A. Graham (hon. secretary) announced with regret the decease since the last meeting of two Fellows: Mr. John Butler, elected 1887; and Mr. James Buckley Wilson, of Swansea, elected Associate in 1872 and Fellow in 1888.

The Chairman, in calling upon Professor Beresford Pite to read the paper of the evening, mentioned that Mr. Pite had recently been chosen as a Professor to the Royal College of Art, South Kensington. He felt sure they all warmly congratulated Mr. Pite on the honour.

Professor Beresford Pite said he was very much obliged for the congratulations conveyed to him. He then proceeded to read his paper, which dealt with "Some Tendencies of the Modern School of Architecture." In his opening remarks, he said he proposed to divide the large and rather indefinite subject into a series of somewhat genealogical chapters, commencing with the close of the well-worn battle of the styles. They would review severally the close of that campaign, then the alliance and combination of the rivals and their devotion to a doctrine that all old work was sacredly beautiful, which issued in a revolt against style in a new and unexpressed manner. They would then consider the effective results of the Gothic revival in stimulating the subsidiary arts and crafts, specially under Wm. Burges and Ed. W. Godwin, also the influence of Wm. Morris upon the purely decorative crafts. The ideal of a revival of the building crafts and J. D. Sedding's influence towards that end would follow. The present usefulness of the work of Wm. Butterfield to the student would be noted, and the potent influence of Mr. Philip Webb, now combining with the school of Mr. Norman Shaw, would bring the review near to its limits, and he would close with a short appreciation of Mr. Bodley's work and with an opinion upon the artistic tendencies of competition designs.

A generation had arisen untrained in the orders and systems of proportion of the art of architecture. The published curricula of the centres of architectural education, together with the Royal Institute of British Architects Examinations syllabus, offered no evidence of a tendency to pursue classic methods of dimension, proportion, and conformity to type upon which the school of the early part of the nineteenth century based its ideals of architectural beauty. The old Classic school was dead. But it died a school, and left existing its concrete methods, its parts, proportions, principles, and orders accurately systematised and available for the use of all inquirers. Its great and chief antagonist had also fallen, for but little life remained in the Gothic school that once dreamed of universal sway. But, asked the lecturer, is the Gothic revival dying with the dignity, traditions, and possibilities of renascence of the older school which it displaced? Does it leave methods, principles, and styles, construction, mouldings, and decorations in such order as to be practicable instruction material for future generations? Or have its motives and principles been merely the reflection of ephemeral sentiment, leaving nothing reproductive and capable of development and progressive tradition? Reviewing the tendency of the Gothic movement, the lecturer glanced at the training and methods of the school, its standards of taste and criticism, its earnestness and enthusiasms, and the spirit in which its students sought to solve the architectural problems of their day. The student was instructed by constant and repeated observation and study to drink in the spirit of the old work, and to design his new buildings while under its exhilarating influence. The mediæval spirit as it was, as it worked, as it drew, was all of system, principle, or method that the modern architect could need. The Gothic revivalist was a craftsman and builder with concrete opportunities, instead of an abstract theorist, and he built upon his discoveries and enthusiasms, and therefore sketched and measured with eyes eager for piquant solutions of the daily difficulties of practice, and found nearly all he wanted. There was a wealth of material indeed, a yet unexhausted store of energy and enthusiasm in the students; but when the change came and the lamp went out there was no residuum of framework, method, or principle, only the inchoate notion of the wild but real beauty of all old work, and a new delight in picturesque draughtsmanship. There were the two main resultants of the Gothic revival at the time of its effective decease, and these effects have since formed the staple tendency of most pursuers of the art of architecture in England. The lecturer then proceeded to discuss their progress and attained results, and the future that may be expected of so narrow an equipment. Is, he asked, the love of beauty stronger than the power of truth? Or is the truth of construction that is dictated by the motto, "Build in Truth," only an exhibited hypocrisy of simplicity, and an anachronism untrue alike to the day and civilisation in which we move?

The progress of the doctrine that all old work is beautiful has been steady, and a limit has scarcely yet been formed for juvenility of the subject of beauty. Yet it must be presumed that the quaint conceits of partial ignorance, with added charms of romantic history, ruin, decay, lichen and ivy growth, have entered unconsciously into the current estimate of the beauty of old work. Apart from these accidents, there is little that

can be described as good or even tolerable design in much old work that has been considered admirable because it is charming. We have lost our way amid the beauties of English antiquity. We pursue no definite ideal now, but wander aimlessly among the enchantments of quaintness, originality, and unrestrained, though demoralising, freedom of design. Breadth of view, sympathy with Nature, a recovered poetry of architectural idea, and a genuine appreciation of the historic element in old buildings, have been gained in our wanderings. We are still enthusiastic, and can talk with earnestness, if not intenseness, of the artistic values and importance of the most trifling elements of everyday buildings. We have around us, in nearly all the branches of architectonic and graphic art, proofs of living vigour of movement, power, and genius. Painting, sculpture, the decorative arts and crafts, are instinct with growth and development; and architecture, which has led the advance and quickened the allied arts into life and power, seems to have exhausted, not her forces, but the material upon which they act, and, burning with suppressed poetic purpose, to have disdained and forsaken her various forms of speech, with all their necessary members of form, detail, order, and group, as unworthy and incapable of sufficient expressiveness of the new light that burns within. The lecturer expressed his conviction that under the seeming voicelessness of the new sound there is present an intelligence and a purpose of expression sincere, earnest, and useful. The hardly developed tongue is one of protest against thoughtless repetition and meaningless quotation in a dead language, and a resolute endeavour underlies it to speak for itself on behalf of liberty to be free from convention in its architecture, and for its attempt to oust the affectation of style by an unaffected stylelessness of difficult simplicity. Ornament in the ordinary acceptation is an abomination to it, while architectural features, methods, and terms must be schooned out of their arrogance, put away, and forsaken. An inquiry whether we shall in the course of elimination and abnegation attain to the simplicity of Stonehenge or of the Great Pyramid in our everyday architecture may indicate the danger, if not absurdity, of striving to make a complex civilisation, as reflected in a necessary art of civilisation, unnaturally simple.

The lecturer went on to show that almost the same tendency had been produced by another road, viz., through the genius, the efforts, and achievements of such leaders of the Gothic school as William Burges, Edward W. Godwin, William Morris, and J. D. Sedding.

In the modern school we have the fruit of seed sown by the great architects of the Gothic movement, viz, the revival of the building and decorative crafts. The starting point of the early leaders was romance, taste, and association. Pugin discovered the riches of ecclesiastical decorative art, and in vestments, furniture, and altar fittings, opened up a new world of form springing from natural and refined craftsmanship. With the advent of William Burges a truer insight and completer grasp of the range of mediæval art was obtained. With scholarly completeness and patience he worked away from the modern architect's standpoint down, or up, to the craftsman's level. Burges had no notion of sacrificing architecture, as the art of beautiful building, to craftsmanship of detail, but he obtained a mastery in both, a mastery found on the pathway of enthusiastic antiquarian research. His was a living art; any example of his works, whether in building, goldsmiths' work, decoration, or furniture, would be attractive and beautiful to us now. Edward W. Godwin had a very similar genius. His architectural outlook was freer, but in the faculty of insight into every craft, and of discerning the essential workmanship of his detail, he was quite his equal. He had the genius of a true antiquarian, and laid hold of the life of the men who produced mediæval art, being drawn out to them with an artist's sympathy, even to their costume. His facility and success in original Gothic design, however, did not betray him into forsaking his true grasp of the realities of architectural art. He took full advantage of the liberty the "Queen Anne" movement offered of release from the traditions of so-called style, and felt his way and worked as a building designer of simple villa houses and economical artists' studios with a rare and refined originality. Present day æstheticism has not carried us beyond the point he attained in his houses at Turnham Green and studios in Tite-street, Chelsea, now twenty years old.

William Morris, himself a fruit of the Gothic movement, and in the sum-total of his life-work mediæval in the truest sense to the end, represents the link between the Revival in architecture and the Pre-Raphaelite movement in painting. His influence and power are working at the present moment upon most, if not all, of the decorative arts. His practical alliance of artists and craftsmen, especially in early days, was an experiment which has left a permanent success as its result. We may still be in doubt as to the practicability of depending for architectural design upon the workmanlike intuition of our artisans, but we cannot avoid recognising that Morris himself was such an intuitive workman artist, and that the zeal which instructed him into that insight was kindled in the generation of Gothic revivalists, and is a veritable and beneficent influence of power in our midst to-day. Principles, however, which seemed obvious in Morris's hands when dealing with decorative art have proved difficult to carry to any extent into the practice of architectural building. Artistic enthusiasm in the craftsmen of brick-work and of masonry is, under present conditions of civil life and business, almost impossible. The attainment of a commonplace standard of honest, sound work is all the architect can hope for, and there are not as yet symptoms of any development among the craftsmen themselves of an enthusiasm for the artistic possibilities of their work which can be allied with the similar movement in the decorative arts stimulated by William Morris. Still, these difficulties have not hindered the achievement of much interesting experimental work.

Touching the late J. D. Sedding, the lecturer said that his manifold gifts peculiarly qualified him for carrying an arts and crafts crusade into the midst of the architectural world. Practical contact with the crafts closely allied to his ecclesiastical work as an architect doubtless drew him to feel the force of Morris's teaching, and he unhesitatingly bounded towards the brilliant vision that seems almost impossible of attainment to us, of a living revival of the building crafts as a basis for all architectural design. He delighted in setting conventions at nought with the subtle play of an able humorist in design, the serious side of his character being bent upon the crafts with which he supplied beauty into his architectural scheme. He obtained assistance from artists and craftsmen all more or less imbued with the new teaching. Holy Trinity Church, Sloane-street, is the best illustration of his methods. The general design aims at and achieves original impressions and effects, not altogether with certain success of scale and grandeur, but with the great interest of freshness in every part. The crafts are contained and displayed within the architectural enclosure of the building, and in the screen wall, pulpit rails, gates, table, and other fittings assert their presence and independence vigorously.

The friends and followers of Sedding have considerably extended the tendencies of his school. They are good craftsmen in charcoal, paper, and pastels; in fact, in all the resources of the architectural draughtsman's palette; and herein lies to a great extent the secret of their power. Is it irony of fate, perversity of nature, or idiosyncrasy of genius which compels so gifted draughtsmen and architects to become exponents of doctrine which disowns draughtsmanship and avoids architecture?

Of the actual effect in a monumental or public building of the new teaching, we have as yet no serious examples. But in a smaller class of buildings, in some interesting domestic instances, we find the enthusiastic architect more or less successfully breasting the tide and importing by the sheer force of his own character the interest of some one or other of the building crafts into his work.

The application of the doctrine of craftsmanship is practically confined to the origination of ornament. The architect can allow the craftsman as much liberty as the employer cares to pay for, with results of really valuable work from accomplished and well-known craftsmen. But the major crafts of walling and construction are still dependent upon the master architect's training, and upon his paper and pencil, for their usefulness or their beauty. Considering, however, the progress and ultimate achievements of the mediæval craftsman in brick and masonry, is not the movement which induced that vitality capable of repetition in a new day of light and progress?

The lecturer went on to give his conception of the architect's relation to the building art, *i.e.*, as the designer and master craftsman; the architect released from a sketchy pseudo-antiquarianism, and the master builder also, delighting in his building craft and designing with the end of expressing his delight in the wonderful resources of each and the sweet harmony of all the elements of constructive craftsmanship. He trusted this was not the empty vision of an unpractical ideal, without examples or instances of achievement. There is, for those who would seek it, abundant encouragement in unlooked places; efforts, sometimes crowned with conspicuous beauty, have been made by earnest men, profoundly dissatisfied with the prevailing want of true ideal, building upon the basis of building art, with simple and beautiful form, devoid of the shibboleths of style, and in many cases rising with them through the level of past art to new life and true modernity of beauty. Of architects whose work may be considered to have attained this quality, the author mentioned the late Wm. Butterfield, Mr. Philip Webb, Mr. Norman Shaw, and Mr. Bodley, passing their works in review, and noting the distinctive merits and tendencies of each. The genius will growingly be appreciated by which Butterfield discerned and seized the essential motive of mediæval building art, and forthwith strove to think for himself and express his own thought in his material for its modern purpose, with absolute new art. His brickwork, stonework, ironwork, mouldings in tracery, shafts, or archivolts—in every way all is as freshly modern as, in its day, was the work of the mediæval masters. In the field of domestic building Mr. Philip Webb occupies a somewhat similar position; the same aloofness from the current standards of architectural "style" characterises his work as Mr. Butterfield's. His houses in Lincoln's Inn-fields and Kensington Palace Gardens are excellent examples of his art. In internal detail and decoration he has in his leading works maintained the essential quality of the building craftsmanship of the architect's art, and been foremost in the revival of the decorative crafts. His work should receive earnest attention by those who seek encouragement from current buildings of real life and progress. Mr. Norman Shaw's creations are too present to be correctly estimated. His grasp of the superficial beauty of old work has been combined with an equal internal completeness, and an amazing versatility qualifies him in later English Classic as in the earlier barbaric, crooked Gothic. He seems to know and feel for each phase alike. Why and how does this genius charm? Is it the man rather than the work? The artist-architect or the architect-builder? The building that provokes the one question is promptly answered by another of the opposite tendency, and yet all are of one spirit. Is this spirit modern? or does it rise with the charms of an apparition of a departed beauty upon our dreams? or is it a living nineteenth-century actuality, typical of our attainment in life and art? Mr. Norman Shaw's school leaves us in little doubt; its members are among the most earnest and successful exponents of the craftsmanship doctrine. In ecclesiastical art of the Modern School, Mr. Bodley, with his complete and perfect sympathy for the crafts of religious art, has been enabled to maintain a useful and effective guidance. In his work, and in that of his immediate followers, there is a sense of satisfaction with the restrained and refined development of later Gothic and Perpendicular for which he has such feeling. The charm is that of perfected fifteenth-century art, revived with the completeness of the original, and infused with its motive and spirit.

Referring, in conclusion, to our civil architecture, the lecturer said that the system of competitions had produced a habit of reckless originality, of tawdry picturesqueness, of ill-digested unscholarly design which was having an alarming influence. Here the lack of tradition and of a school of settled orders and proportions has the most damaging effect. In domestic and ecclesiastical art we have survived the Gothic revival and its repression of classicism with some success, but in civil architecture our architects are sadly and truly demonstrating their demoralisation, and sadly needed the advice and remonstrances of such a master as Sir Wm. Chambers.

Mr. J. M. Brydon, in moving a vote of thanks to Professor Pite, first congratulated him on the

honour that had been conferred upon him by his selection as Professor of Architecture at South Kensington. If his eloquence, his knack of putting things in an interesting manner, were any criteria of what a professor should be, he ventured to say that Mr. Pite would be an ideal professor. Passing on to consider the paper just read, he remarked that it was headed "Some Tendencies of the Modern School of Architecture." They would forgive him (Mr. Brydon) for saying that it was pleasing to him to find that there was a school at all, and pleasing, secondly, that there was any tendency at all. Professor Pite, who had wandered somewhat from his text, instead of giving what he (the speaker) would have characterised as a description of the modern school and its tendencies, had given them a description of several revivals in the nineteenth century, and of the great men who had taken part in them. Certainly they had had some references to craftsmen, which was one of the tendencies, and to the want of style, which was another, but really he felt some doubt as to what the "tendency" was, except that all traditions were to be abandoned, and every one was to do what pleases him in his own eyes. He (the speaker) was, to a certain extent, all for that. Wherever tradition was found to hamper a man, throw it overboard; but to throw it overboard for the sake of throwing it overboard was not likely to help a man. This was an age when a knowledge of proportion was disregarded. If, for example, it was going to increase the beauty of a column to dwarf it to the proportion of a sausage or draw it out to the proportion of a gas pipe, one could, of course, do so, but he questioned the excellence of the result. If, on the other hand, it was thought that to improve the entablature of a column, that half of it should be omitted—that sometimes the frieze, sometimes the architrave, and the cornice should be dumped down on top of the column—if that was the tendency he doubted very much whether it was likely to improve architecture either in proportion or detail. Again, if it were an improvement to omit the volutes of an Ionic cap and merely to put the abacus and some mouldings in, he very much questioned whether, if that was the tendency, it was going in the right direction. Again, in regard to the principal doorway of a building, there used to be an idea that it should be somewhat higher than its breadth, but the modern tendency seemed to be to make it rather wider than its height, and to limit the width, so that a tall person had difficulty in entering. That might be an improvement on the old method, but that was not his opinion, nor did he think it an improvement that all manner of bay windows should be stuck where none were wanted and where it was difficult to see from. He thought that the followers of that tendency ought to go back to school for a little longer and study in the school of tradition and the works of Sir Wm. Chambers, Cockerell, and Barry, for instance. He yielded to none in his admiration of the men whose names had been mentioned by the lecturer, for they were artists in the best sense of the term, and they all, more or less, found out the limitations of all so-called revivals. If the tendency of the modern school could be directed to take up the thread of the old English architecture that was broken in the attempt to revive the Greek exotic, the foundation might be laid of an advance which, in the coming century, might be of great value to English architecture. It was appropriate that they should have had a paper like that at the last meeting of the Institute this century, and he would suggest that Professor Pite should give them a paper critically reviewing the architecture of the nineteenth century—not the men who did the work, but the work itself. Possibly we are too near the execution of the work to classify it properly, but the study would be a most interesting one. There seemed to be an architectural chaos, for architects seemed to be groping about and trusting to the crafts.

Mr. H. H. Statham, who seconded the motion, said it was somewhat difficult to speak on the paper because he could not exactly understand what the Professor was driving at—what he advised them to do. One or two points, however, struck him. In reference to Mr. Butterfield's architecture of which Professor Pite spoke with an admiration with which he (Mr. Statham) quite sympathised—it was remarkable that, although we had got tired of most of Gothic revival work, Mr. Butterfield's churches still retained their interest; they were not merely revived Gothic; he put always something original and his own into them. With regard to the influence of competitions on architecture, Professor Pite seemed to think they had had a bad effect on modern architecture. He (the speaker) did not share that extreme view. A great many architects sent in to competitions very curious and eccentric designs in order to attract attention to their originality. As one who had examined many of these, he observed that these designs were never the selected ones. The best chance in a competition was to send in a good plan and a design in tolerably close adherence to conventional lines. The eccentric designs were always, as he had said, unsuccessful, therefore it was hardly fair to charge the competition system with encouraging this eccentricity in architecture. As a reverse to eccentricity, they now found architects who made what he might call an ostentation of simplicity; all architectural detail was eliminated. Surely they could find a medium between a gimcrack ornamentation and no ornamentation at all.

Mr. H. G. Ibberson thought there was a good deal in the arguments that had been made by Professor Pite. The whole of the paper had been intensely interesting and very suggestive. He sympathised with the extreme difference there was between craftsmen of the decorative arts and craftsmen of the more structural and simpler forms. As to competitions, he did not feel that they had encouraged fantastic work, though they may have encouraged commonplace designs. One had to pander more or less to popular taste, and that was intensely commonplace.

Lieut.-Col. Prendergast said the question dealt with in the paper, as he understood it, was—Have we or have we not made progress during the nineteenth century in the art of which that building was the home? He was old enough to recollect the beginning of the Oxford Movement and its corollary—the Gothic movement. He recollected that old Henry VI. chapel at Eton with its fifteenth century roof. An architect—he was not sure whether he was a member of the Institute—must needs secure the great cusps to those beams in order to satisfy the Gothic mania. The history of the work of great architects during the past century had been gone into in such detail that it would be quite unnecessary for him to follow on, but this he would say, that the gist of it was—Who were the great men in the century to whose work we might look back upon? He had had to spend many hours in what he considered the greatest building in our time—the Houses of Parliament. Unfortunately, he did not have the benefit of hearing the instructive paper read before the Institute by Mr. Brydon on Cockerell's work, but what it taught must have been that in the architects of the century they had had great men. With the two or three words Mr. Brydon said against breaking the thread of tradition he entirely agreed. They had travelled over an enormous field—from Queen Anne to Morris—and the truth was they must put up with this turmoil of taste, but they could not deal with architecture as they would deal with millinery and let fashion decide. They must put down their foot somewhere, and it must be at breaking the thread of tradition. Architecture, they must remember, was thousands of years old, and he hoped its traditions would remain for many thousands more.

Mr. E. T. Hall remarked that some of the preceding speakers seemed to have failed to see where Mr. Pite's paper was leading them. For himself, he regarded the paper as a very good exposition of the tendency of modern architecture, and, at the same time, it had as its text that architects should not be slaves to style or simply copy old traditions, but should think out their own problems and, with the knowledge that the older architects had given them, proceed in the way they did. Let them then think out their own problems and evolve their own style. Mr. Pite said: Do what thirteenth century Gothic architects did for themselves. They were not tramelled by style, and they had to think out their own problems and evolve a new style. If those architects had gone on the lines Mr. Brydon suggested we should never have had past styles to help us now.

Mr. E. W. Hudson believed that the speeches of Mr. Brydon and Mr. Hall both contained germs of truth. For himself he regarded Professor Pite's paper as giving some wonderful analyses of the phases of architecture during the greater part of the century. One phase of modern architecture which had not been dealt with was that which had developed in the colonies. The name of Burges had been mentioned that night; that name was always received there with a great deal of pleasure, and it must be very agreeable to the Chairman. He remembered drawings published in the journals at the time, and they impressed him very much as being delightful adaptations of Gothic works to the needs of our colonies. He would mention the cathedral of Allahabad as one example; a building of which the chairman himself would know a great deal. He thought there had been a distinct improvement during the past three quarters of this century, and the thing to be considered was, What is to be the outcome of all this, and what is to be the future of architecture? They now had ladies in the profession, and ladies had done wonderful things in the past. An American lady at the Paris Congress answered the question he had put by saying that the architecture of the next century must express "the liberty of man, the dignity of woman, respect for work as work, love of justice, and universal peace." If that was to be the position of architecture in the twentieth century, he for one would not be entirely in despair.

Mr. G. H. Fellowes Prynne regarded the paper as an excellent incentive to them to start well with the twentieth century. Now that Gothic architecture was so much despised by students of the present day—by despised he meant not sought after and a disposition not to regard it as the ground-work of architectural studies—he thought they could not have much progress in the next century unless their students built upon a foundation of this sort. They must have their foundation, whether that was Gothic or Classic, and with it they would be nearer in gaining their end than by the new style of so-called simplicity.

The Chairman said he felt some difficulty in arriving at a conclusion as to what the Professor thought the tendency of the moment was. At the same time, one of the speakers had, he thought, hit the nail very happily when he said that the present position was a "turmoil of taste." It was rather curious that there should be a turmoil of taste. In the past the works most admired had been by those men who had closely studied old work and followed on its lines. At the same time, if architects were true to themselves, endeavoured to educate themselves, and instil into their work their own instinctive feelings, they would produce something which must be interesting for generations. From remarks made that night, and from one's own observations, it was perfectly certain that art was not confined to one school. In the same breath were mentioned the works of Cockerell, Burges, Barry, and Butterfield, entirely different in themselves, but whilst different they found beautiful things in all these works when the architects had imparted into them truth and personality. The turmoil of taste had, he thought, caused a great many of the complicated problems which architects now had to solve. In olden times the problems were not so complicated as now. When they thought what, in the metropolis, an architect had to arrange in designing a big building, it was clear that they would come to the conclusion that neither Gothic nor Classic in themselves would be suitable to solve those problems. In the next century they might find a solution of the problems, and perhaps, while adhering to simplicity and originality, they would not neglect going back to the models of ancient times.

The motion having been heartily agreed to,

Professor Pite, in reply, said that by the expression "Modern School" he did not mean the future school—he meant the architecture current during the latter part of the century. His object was to review tendencies one with another. He would conclude by inviting them to study Sir William Chambers. But he looked with terror and amazement at any attempt to take up English architecture at the moment it was left by the Greek revival. They must get back themselves and learn the alphabet and the syntax of architecture before they entered upon the composition of the finished works, such as were shown by architects in the last century. The future lay in the next century, and he hoped those who followed them would have a more satisfactory review to make, though he thought they would not have a more striking range of talent to deal with than we had in looking back on the nineteenth century.

The Chairman said that was the last meeting of the century, and before they parted he desired to wish them a happy Christmas and prosperity during the first year of the coming century.

THE SURVEYORS' INSTITUTION:

FUTURE OF THE LONDON WATER SUPPLY.

THE following is the conclusion of Mr. R. E. Middleton's paper on "The Future of the London Water Supply," read before the Surveyors' Institution on the 10th inst., as mentioned in our last issue, when we gave the first portion of the paper:—

Sources of Supply.

"Having estimated that at some date or another, which for the sake of argument has been called the year 1961, the population to be supplied will number 19½ millions, that the rate of supply, which, supposing waste be prevented, may provide for much cleansing of streets and for public fountains, will be 35 gallons per head, and that the quantity of water to be supplied, including a reserve of 5 per cent., will be 717½ million gallons a day, it is required to show from what sources this enormous quantity of water, which is nevertheless half of the average flow of the Thames, can be drawn.

The Thames.—The area of the Thames basin down to the intakes of the water companies at Hampton is 3,548 square miles, and the water run off from this area during the last sixteen years has measured 8·22 in. of rain, or 1,166 million gallons a day; the average rainfall during the same period has been 26·36 in., or 2·14 in. less than the 28·5 in. which the late Professor Symons determined to be the general average rainfall in the drainage area of the Thames above London. It is not easy to determine what proportion of the 2·14 in. deficiency of rainfall during the last sixteen years would, on the general average of years, find its way into the river; but it is not likely to be less than two-thirds, which would make the general average run off over a long period of years 9·64 in.—say, 9·70 in. If the average run off be 9·70 in. of rain, the average flow is 1,376 million gallons a day. The Report of Lord Balfour's Commission puts this figure at 1,350 million gallons daily. The run off of the Thames, measured at the same point, has been, on the average of three dry years, 970 million gallons a day, and during the driest year 616 million gallons daily. Speaking generally, the amount of water drawn from the Thames during any year will approximate to the average supply; the proportion of the flow of the river taken for this purpose will therefore be, on the average of years, 30 per cent., and on the average of three dry years 40 per cent. nearly. During the driest year the quantity of water drawn from store is so large in comparison with that drawn direct from the river as to amount probably to some 90 million gallons daily, and the average quantity drawn from the river during such a year will not exceed 310 million gallons a day, or 48·17 per cent. of the river's flow. In the Welsh rivers, supposing the proposed reservoirs to be of sufficient capacity, and a quarter of the average available flow of three dry years to be given as compensation, the proportion drawn for purposes of supply would be, on the average of years, approximately 55 per cent., on the average of three dry years 72 per cent., and during the driest year 98 per cent. It does not require any very elaborate calculation to show that the supply which is only 48 per cent. of the flow of a river, during the driest year for more than 80 years, is better secured than when 98 per cent. of the whole flow of the drainage area has to be taken to satisfy an almost identical supply. Although it is herein accepted that, under the conditions of storage recommended by the Royal Commissions presided over by Lords Balfour of Burleigh and Llandaff, the maximum supply to be drawn from the Thames is 400 million gallons a day on the average of a year, it must not be concluded that the capabilities of the river for purposes of supply are thereby exhausted, but that it becomes a serious question whether it is economically desirable to further increase the supply to be drawn from this source.

River Lea.—Lord Balfour's Commission decided that, with the introduction of adequate storage, which is in course of construction, 52½ million gallons a day can be obtained from the River Lea. Twenty-two and a half million gallons daily are taken by the New River Company without storage, 5,400,000 gallons daily must be provided for the use of the Lea Navigation and 30 million gallons per diem are, under the above conditions, available for the East London Company. The average flow of the River Lea, as measured at Feilde's Weir, is about 120 million gallons daily, or 7·11 in of rain run off from an area of 422 square miles. The average rainfall in the Lea Valley is 26·50 in. (Sir John Evans says 26·24 in.), while the average for the last sixteen years has been 23·91 in., or a deficiency of 2·59 in The average run off for the same period has been 6·31 in. of rain, equal to 106½ million gallons a day. The average flow of the Lea during the three dry years 1897, 1898, and 1899, was 78·4 million gallons daily, and during the driest year 42·3 millions. The rainfall for the years 1862-3-4 was 21·86 in., and the run off was at the rate of 4·79 in., or 80·8 million gallons a day. For the years 1863-4-5, the rainfall was 22·88 in., and the run off 4·48 in., or 75·6 million gallons daily. The average ratio of the run off to rainfall is 20·7 per cent.

For the years 1893-4-5, the rainfall was 23·28 in., and the run off was 4·89 in., or 82·5 million gallons a day. The rainfall for the years 1897-8-9, was 23·56 in., and the run off 5·23 in., or 88·2 million gallons per diem. The average ratio of the run off to rainfall is 21·2 per cent. These figures are corroborative one of the other, and it is shown that there is no falling off during the later period in the proportion of the rainfall which finds its way into the river.

Wells in the Lea Valley.

In the Report of Lord Balfour's Commission it is stated that on the average of three dry years 56 million gallons of water may be pumped daily from the chalk basin of the Lea Valley without injury to any material interests, and that during the driest of three dry years 47 million gallons a day may be pumped. In corroboration of these figures, if the average rainfall be 26·5 in., and the loss by evaporation so high as 16 in., the available rain will be 10·5 in., or 177,240,000 gallons a day, but the average run-off of the river is 120 million gallons daily; there is therefore a quantity of 57,240,000 gallons a day which passes down through the chalk basin, and does not find its way into the visible river. Should the loss by evaporation be 15 in. instead of 16 in. per annum, as seems probable, the available rainfall will be 11·5 in. or 194,120,000 gallons daily, and the quantity passing down through the chalk basin 74,120,000 gallons per diem.

Having shown that the available water in the chalk basin is certainly as much as 57 million gallons daily, and may be 74 millions, it is unnecessary to follow the argument further, especially as these figures confirm the conclusions arrived at by Lord Balfour's Commission. Even supposing the pumping during the driest year to exceed the available supply due to the rainfall of that year, a contention negatived in the Report of Lord Balfour's Commission, the reduction in the level of the water in the area below the pumping station due to pumping would be very small, and in the area above the pumping stations it would be non-existent. It is not possible to estimate with any degree of accuracy either the area of the chalk basin below the pumping stations which might be affected by excessive pumping nor the capacity of the chalk for parting with the water contained in its pores and fissures, but it is not unreasonable to calculate that a reduction of level of 1 ft. over the whole area would mean the removal of some 50 million gallons of water daily; thus excessive pumping to the extent of 10 million gallons a day continued for a year would mean a reduction in level of one-fifth of 1 ft. or 2·4 in. Obviously the level is not reduced, if it be reduced at all, regularly over the whole area, but is at its maximum in the line of the wells, decreasing to nil at a short distance above the highest pumping station and laterally from the same station, and widening out lower down in the area; the depression may therefore extend to many inches at the well, although when extended over the whole area it is very trifling. Whatever the reduction of level might be in one year of great drought, in the next year of excessive rainfall it would be made up again and something over.

As regards the area above the pumping station, a little consideration will, it is thought, show conclusively that the effect of pumping cannot extend beyond a limited distance. What that distance is must depend on the nature of the material in which the well is sunk, on the depth of the well, and the level to which the water is reduced in it when pumping.

In a purely chalk formation it is believed that the effect of pumping is seldom felt at a greater distance from the well than a quarter of a mile calculated on the level. When the well is situated at the foot of a steep escarpment, this distance is likely to be exceeded, and the same holds true of a chalk area covered with gravel charged with water, and it is known that the effect of pumping has been felt at a distance of a mile.

Given a well sunk to the bottom of the chalk on to the impermeable stratum below it, given engine power sufficient to pump the well to the bottom, and to continue pumping without intermission from year's end to year's end, not always at the same rate, but so as to keep the pumping level of the water in the well as near the bottom as is practicable, continuance in pumping will not extend the area of absorption, which will only vary from season to season with the level of the water in the surrounding strata. If the level of the water in the district rises, so will it rise in the well; if the level of the water in the district sinks, the water in the well cannot sink lower, for it is already at the bottom; the diameter of the cone of absorption will therefore be reduced and the quantity of water pumped from the well will be decreased. The same principle may be applied to a visible and uncanalised river, and an illustration drawn from such a source may appeal more readily to the mind than where underground and invisible sources are to be considered.

Let a well be sunk in the middle of an uncanalised river, and let pumping machinery be provided of sufficient capacity to lift the whole of the water running down to the pumping station at any time and to transfer it in some other direction. Below the pumping station the bed of the river will be dry for some distance until enough water accretes from the banks, from the bed, and from tributary streams to renew the flow to some limited extent. At the pumping station the depth of the water will be reduced from what it was when the river flowed naturally down its bed. Above and near to the pumping station the velocity of the stream will be increased and its depth reduced, but at some distance, varying with the volume of the water and the depth of the river, the original conditions will be restored. The quantity of water to be pumped may be at the greatest 20,000 million gallons in a day, and at the least 200 million gallons, but this quantity will not be affected by the presence of the pumping station, nor will the flow of the river be altered even fractionally by the pumping, how long so ever it may be continued, but will depend as heretofore on the rainfall in the drainage area.

What is true of pumping from a visible river is true also of pumping from wells sunk into the chalk. In the river the depth of the water is limited; but its flow being only resisted by surface friction the gradient of approach is flat; in the chalk the depth of the well may be great, 400 ft. or more, but the water having to pass through innumerable small fissures, the resistance to its approach to the well is great and the gradient of approach is steep, probably one in ten or thereabouts; but whatever the gradient may be it remains constant so long as the vertical distance from the surface to water near the bottom of the well remains the same.

There is an undoubted popular belief, which is not however founded on any scientific data, that the flow of the rivers and streams in Hertfordshire is being gradually reduced in volume, the loss being ascribed to the pumping of the New River and East London Companies. When, however, it is found that a supposed falling off in the flow of the river Ver is mentioned in monastic times, that Mr. Homersham speaks of the same thing in 1852, and it is again referred to in or about 1864, all being dates antecedent to the pumping of any considerable quantity of water from the chalk basin, some other explanation of the phenomenon, if there be one to explain, must be looked for, and is to be found, in the meteorological conditions of the later period referred to. Mr. Homersham probably had in his mind some former period of drought, as the year 1852 was near the termination of a period of wet seasons; but the year 1865 came at the end of twelve years of less than average

rainfall, and the year 1899 terminated a similar period extending over sixteen years. As the river Ver, for instance, fluctuates in the position of its source by five miles, and other rivers fluctuate in a similar manner, though to a less degree, between high and low water periods, it is not perhaps to be wondered at that what happened in 1883, and again in 1897, when these rivers rose at their highest points, is lost sight of, and when some years later the source is miles lower a fear is aroused that what happened in 1883 and 1897 will never happen again. Exactly the same fear was felt and given expression to in 1891-2-3, yet its falsity was set forth so soon after as 1897; nevertheless, so wedded have the people become to an unfounded belief that the same story is produced in 1898 and 1899. Some words of apology are necessary for the length to which this argument has been followed, but as it is desired to show conclusively that the districts from which the water supply of the Metropolis is to be drawn will not be injuriously affected by its abstraction, it is necessary to go into the matter in some detail.

Wells in the Thames Valley.

The chalk area in the Thames basin above the intakes of the water companies is 1,005 square miles, which may probably be increased to 1,400 square miles by areas which drain on to the chalk. Following the figures of the basin of the Lea, where the area contributing to the chalk is 352 square miles, if this area can afford 47 million gallons a day during the driest year, 1,400 square miles will supply 187 million gallons a day; but the rainfall in the Thames Valley is 28·5 in., or 2 in. greater than that of the Lea, and the yield of the chalk area must be raised in the same proportion to 201 million gallons a day. The Report of Lord Balfour's Commission says that any such abstraction will probably be at the expense of the springs and streams feeding the Thames. Against this contention it may reasonably be argued that the conditions in the two valleys are identical, and on this basis it can be shown that this or a larger quantity is available.

The area of the Thames basin is 3,766 square miles, the average rainfall 28·50 in., and if the loss by evaporation be taken on the average at 16 in., the run off should be 12·5 in.; the actual run off is, however, 9·7 in., therefore there are 2·8 in. of rain on an area of 3,766 square miles, equivalent to a quantity of 422 million gallons a day absorbed into the ground, but which does not find its way into the river, and is therefore available for supply without injury to the river.

On the average of three dry years the rainfall will be 24·5 in., and taking evaporation at 14·8 in. the run off should be 9·7 in.; it is, however, about 6·8 in., therefore 2·9 in. or 437,000,000 gallons a day are available.

During the driest year the rainfall is about 21·00 in., and taking evaporation at 14 in., the run off should be 7·00 in.; it is, however, 4·3 in., therefore 2·7 in. or 437,000,000 gallons a day are available for supply, and it is shown that the estimate of 200,000,000 gallons daily, derived from a comparison of the Lea Valley with that of the Thames, is a conservative one. From the Kent Company's district Lord Balfour's Commission estimated that 27½ million gallons a day may be pumped, and from the chalk area of Kent outside the Kent Company's district 123,000,000 gallons daily.

Besides the areas referred to above, there are others in Sussex, Surrey, Hampshire, and Wiltshire, from which an additional supply might be procured, which would considerably augment the available sources to which special reference has been made and which are:—

	Million gallons a day.
From the River Thames	400
From the River Lea	52½
From wells in the Lea Valley ...	47
From wells in the Kent Company's district	27½
From wells in Kent outside the Kent Company's district, say	110
From wells in the Thames Valley ...	200
Total	837

The sources of supply tabulated above, without consideration of those which exist in Sussex, Surrey, Hampshire, and Wiltshire, are therefore sufficient for the supply of a population of nearly twenty-four million persons with 35 gallons of water per head per diem, and are much more than sufficient to supply the population which, on the basis of calculation adopted by Lord Balfour's Commission, might possibly have to be provided for in the year 1961, or more than sixty years hence.

It is hoped that sufficient has been said to prove that the sources of supply within a moderate distance from London are more than enough to provide water for any population which may reasonably be expected to be congregated within the Metropolis, while providing amply for the requirements of the areas other than those above the intakes of the companies, from which the supply will be drawn. When the population to be supplied numbers, say fifteen million persons and is still growing, it will be time enough to consider whether an additional quantity of water should be looked for from Sussex, Surrey, Hampshire, and Wiltshire, from Wales or elsewhere.

It has been shown that the population above the intakes of the water companies will not be injuriously affected by the requirements of the Metropolis, however large they may become, while the interests of the inhabitants within the area of supply and to the eastward of the intakes are safeguarded along with those of Metropolitan London itself.

It can be proved conclusively that the bringing of water from Wales of different quality, but no better than that which can be provided from the neighbourhood of London, would be very much more costly than to extend the sources already brought under contribution, while it seems more reasonable to use up the nearer supplies first, rather than to go for a limited supply to Wales and then be obliged to supplement it from the Thames and from wells afterwards.

I cannot but feel that the paper I have ventured to submit to your suffrages is inadequate, that it is already long, even to the extent of tediousness, and yet I have been obliged to omit much of the proof from my arguments. I believe, however, that the more this momentous question is investigated in a spirit of pure research, the more fully will the conclusions which I have submitted be confirmed in all their bearings."

The Chairman said he thought it would be but fair to the reader of such a valuable paper to adjourn the discussion until another date, so as to give members an opportunity of thoroughly studying the paper.

Mr. Rickards, Q.C., said he desired to propose a vote of thanks to Mr. Middleton for his paper, and he agreed that as the subject was of considerable importance, as the paper contained so many figures, and as the subject had so many sides to it, it was desirable to defer the discussion until another date.

Mr. H. Lovegrove said he heartily seconded the vote of thanks, although he did not agree with some of the conclusions of the author. The subject was of the greatest importance to the inhabitants of the metropolis, especially if the population were to increase to anything like the extent estimated. For his part, he doubted whether it would, and there were already indications that it was not increasing so rapidly. He was not in favour of using the Thames as the chief source of the water supply of London. Although clever chemists told them that the water supply from the Thames was absolutely pure, how could that possibly be the case with such a large population on the banks of the river, and when the river was used in so many ways and as a place of discharge for all sorts of filth? It seemed to him that London would have to go to Wales for a pure water supply. Glasgow was quite a model place as regards its water supply, for although the waste was great the supply was pure. As to waste, that was a matter which should be dealt with by the Local Authorities, who should see that the fittings were of the proper character. There was a great deal of waste in London in consequence of defective fittings and cisterns. As to the "lavish supply" of water in Paris, he had always thought there was a shortage there.

Mr. W. Whittaker, of the Geological Survey, said the question was a peculiar one, because London was placed in a peculiar position, because there was no other large town in England, as far as he knew, which got its supply from its own watershed. London was lucky in being able to get, as it had up to the present, its supply near by. Mr. Middleton said that if it could be shown that the same sources of supply which had been sufficient in the past could, if adequately guarded and under proper treatment, be made sufficient for the future requirements of the population, it would be agreed that no anxiety need be felt for the immediate future. That was all very well, but as the supply was under human control the supply was likely to be inadequately guarded. Opponents to the Thames supply would, at all events, say, "Let us get our supply where there is not the same necessity for guarding." In regard to the water supply of Kent, he thought Kent was perfectly well able to supply itself, and perhaps help neighbouring counties, but the case with Essex was different. It was most difficult to get water in Essex, for, excepting the Lea area, Essex had to depend on wells, and sometimes the supply was not good. Mr. Middleton said that the supply in Essex would suffice for a population of 100,000 in 1961, but only recently two Bills were introduced into Parliament, the projectors of which estimated that long before 1961 the need of Essex would be 14,000,000 gallons a day, and that implied, of course, a good deal more than 100,000 people. Figures were capable of a good deal of interpretation. As to whether the people below the intakes would suffer from any abstraction of water from the river, he did not think the point had been settled. As to waste, he did not think Mr. Middleton need go so far as America, Glasgow, or Paris for his illustrations. The question of waste was one of the most important in connexion with water supply. He believed that there was a great deal of waste in London and in many large towns, and in his opinion 35 gallons a day per head were, for present uses, a great deal more than was necessary in London, and a good deal of those 35 gallons was wasted. Some steps should be taken to stop that waste; perhaps by giving the companies more power in the matter. Mr. Middleton seemed to think that, should the water companies be transferred to a trust, this waste would be put down with a strong hand; that seemed to him (the speaker) to be one of the strongest arguments that could be urged for giving the control to a trust, when any measures taken to stop waste would have the effect of making the water go further. He believed that Mr. Middleton was quite right in the matter. In considering the real value of the Thames for water supply they must remember that the Thames did more than give a water supply. The Thames was not only a river, but it was also a great water park—a great recreation ground for a teeming population, and a very good use for a river, too, though that conflicted to some extent with water supply. In reference to Mr. Middleton's remarks as "to the arguments used against the continued use of the Thames and the Lea," he (the speaker) thought that the argument was rather against the continued extension of the use; very few people would be found to advocate entirely giving up the Thames and the Lea. Mr. Middleton had to acknowledge that there were organic impurities in the water, and of course there were more or less in all waters, but, as a general rule, it was more often found in rivers which flow through a polluted area than streams which were more or less moorland, and which ran through sparsely populated districts. As to Mr. Middleton's remarks as to the existing divisions of the country into counties, unions, and parishes, of course the existing divisions were not made on scientific principles, nor with any regard to water supply, but purely in a territorial manner. It would be a very difficult matter to alter these territorial boundaries, and would be troublesome in many ways. Of course, in the area of the Staines reservoirs it was not a question of area, and if the engineers chose to deepen the reservoirs they could do so with less area. Mr. Middleton spoke of two Royal Commissions, but those were not the only Commissions that had been held, and now we are apparently getting ready for another. He (the speaker) would like to see something practical come out of them. The average flow of the Lea during the driest year was 42 million gallons, and we were now getting, in the case of that river (if we had not already got), to the limit to which water could be got from it. Calculations based upon rainfall and the quantity of water that went into the chalk were not sufficient to enable one to estimate what could be got out of the chalk. As to the wells in the Thames valley, Surrey could take all the water it could get from that source, and it was no use to think of getting water from Surrey for outside purposes. The area of chalk in Surrey was not particularly large,

while the population was; and they were also strong enought to look after their own interests. Any one who tried to get water out of the basin of the Wandle would find it a rather costly proceeding. As a matter of fact he thought Surrey would have to look for an extension of the London supply in order to cope with its own demands. Any extension of the London supply would have to consider the areas at present considered outside the boundaries of the London Companies, and the big scheme would have to help the little ones.

Mr. Chatfeild Clarke, on behalf of Professor Henry Robinson, moved the adjournment of the discussion.

The vote of thanks having been agreed to, and Mr. Middleton having briefly replied, the discussion was adjourned until January 14.

Illustrations.

THE NATIVITY: DESIGN FOR WALL-PAINTING FOR A CHURCH.

THIS design, which needs no explanation, is from a cartoon by Mr. N. H. J. Westlake, made for execution as a decorative painting on the walls of St. Matthew's Church, Sheffield. It is entitled "Gloria in Excelsis Deo." We are indebted to Mr. Westlake for enabling us, by the loan of it, to present our readers with an illustration specially suited to the present season.

DETAILS OF VARIOUS WORKS BY MR. R. S. LORIMER.

THIS collection shows various designs for small things recently carried out by Mr. R. S. Lorimer, of Edinburgh; a chamber-organ case, two bits of heraldic sculpture, an iron gate and pier, a lodge, and a column to be placed in a garden. The following is a brief description by the architect:—

Gate-house, Balcarres.—This gate-house was erected two years ago at the entrance to a new approach leading to Balcarres House. The work was done by local contractors. The gate was made by Houston & Stewart, Edinburgh; and the stone carving by Mr. Stodart, of Edinburgh.

Organ-case, Ellary.—The organ-case shown was made of oak. The doors were inlaid with a simple design in the form of a diaper. The pipes were of block tin, and the centre pipes diapered with a pattern.

Heraldic Carvings, Minto. — The animals shown are the supporters of the Minto arms, and sit on the ends of the parapet of a bridge in the grounds of Minto House.

The bridge is a single large arch all built in the clean built rubble work customary in the Galashiels district, the only hewn work being the cope and the ends shown.

Pillar in a Garden.—This pillar is the central feature of a small enclosed garden. It is of stone, and wreathed with honeysuckle. The figure is carved of teak wood painted and gilded, and screwed on to the top of the pillar with a copper bolt. The figure was carved at the studio of Messrs. D. & J. Clow, of Edinburgh.

PORTION OF THE BANQUETING HOUSE, WHITEHALL.

THIS subject was set by the Royal Academy for the competition in architectural perspective drawing, and the illustration is taken from the drawing by Mr. George Thow Smith, for which the silver medal of the Academy was awarded. We may congratulate the author on having made a very careful and conscientious piece of work, which is valuable as an illustration of the proportions and treatment of a famous example of English Renaissance architecture.

PLAN AND ELEVATION OF AN AMERICAN FRAME-HOUSE.

THESE drawings form a portion of the illustrations to the paper on the American frame-house by Mr. H. Budden, printed on another page, in which they are fully explained.

CHURCH, NEW HINCKSEY, OXFORD.—The new Church of St. John the Evangelist, New Hincksey, was opened recently. The architects were Messrs. Bucknall & Cowper, Westminster, and the builders Messrs. Kingerlee & Sons.

BLACKBURN POLICE-COURTS AND FIRE-STATION COMPETITION.

THIS limited competition has now been settled by the Corporation adopting the award of the assessor, Mr. A. N. Bromley, of Nottingham. Six firms of architects were invited to compete, each firm being promised a fee of seventy-five guineas if, in the opinion of the assessor, the design was in accordance with the conditions. A hundred and seventy-five guineas, however, were to be paid to the authors of the successful design "should the work for any unforeseen reason be abandoned," but otherwise they would be employed to carry out the work for "the ordinary commission of five per cent." The Corporation—very wisely, we think—did not bind the competitors to a slavish adherence to the schedule of accommodation, but suggested that each should "use a reasonable discretion in preparing his design." The particular portions of the site to be allocated to the different buildings were not specified, this also being "left to the discretion of the competitor." Notwithstanding the latitude allowed, the grouping of the buildings is very similar in all the designs except that by Mr. Hare.

The scheme includes a court house, containing a police-court and a police and sessions court, with all the usual rooms for magistrates, clerks, solicitors, witnesses, and others; and a police department with rooms for the chief constable and other officers, as well as for the police generally, cells for prisoners, mortuary, post-mortem room, ambulance house, &c. In the fire station accommodation was required for seven engines, stable for eight horses in addition to two isolation loose boxes, together with storerooms, workshops, recreation-rooms for the firemen, hose-tower, fire-escape accommodation, inspector's office, &c. A superintendent's house was also required and nineteen houses for firemen. Part of the site was to be used for "a spacious drill-yard," and another part, containing 2,200 square yards, was to be left vacant at the back corner of the site.

The cost of the whole work was limited to 40,180*l.*, namely, 36,000*l.* for the police-courts and fire station, and 220*l.* each for the firemen's cottages. "If a competent builder cannot be found to carry out the work within 10 per cent. of the successful competitor's estimate, the Corporation shall not be bound to remunerate the competitor of the discarded design in any way whatever, and shall be at liberty to employ another architect." This is a reasonable stipulation, and we may say, without any reference to the possibility of its application to this competition, that it would be a good thing if such a condition were sometimes acted upon. Unsuccessful competitors, who have studied economy in their designs, would not then have so often to grumble at the acceptance of a design which cannot be built within 50 per cent. of the stipulated cost.

The site is an irregular pentagon, with the principal frontage (about 400 ft. long) to Northgate; the return frontages are to Blakey Moor on the left and Duke-street on the right, and each of these frontages has a salient angle at about the middle of its length, the rear lines of these angles meeting at a point at the back of the site. Without exception the competitors have placed most, if not all, of the firemen's cottages in Duke-street, and the fire station in the right-hand portion of the front in Northgate, and all (with one exception) have placed the court house in the left-hand portion of the same frontage.

Design No. 1, by Mr. H. T. Hare, is the one which shows most variation from this type. He has placed the court house in the centre of the Northgate frontage, with the police department to the left and the fire-station to the right, the whole forming a continuous building with the tower of the court house for central feature. All the other competitors have designed the fire-station as a distinct building, at a greater or less distance from the court-house block.

By utilising the whole of the frontage in this manner Mr. Hare is enabled to reduce the depth of the front buildings, and to provide a better-shaped drill-yard than any other competitor, but the design as a whole is hardly equal to the author's usual work. The principal entrance of the court house is in the centre of the front, and is approached by a flight of eight steps. The entrance hall is 18 ft. wide and about 100 ft. long, extending to th right and left of the entrance, and would form a convenient promenade for weary witnesses and briefless barristers. Directly opposite the entrance, a top-lighted corridor, 8 ft. 6 in. wide, leads to a back corridor parallel with the front hall, and behind this corridor the magistrates' and recorder's rooms, clerk's offices, and grand jury room are placed, together with a staircase leading down to the magistrates' private entrance in the drill yard. The two courts are placed longitudinally between the entrance hall and the back corridor. The galleries of the courts are aproached by separate entrances from Northgate, but there appears to be no access to these galleries or to the stairs leading to them except through these external doorways. The fall of Northgate from right to left is utilised by placing the police department at a somewhat lower level, and two stories are therefore obtained in this part of the building, although the main cornice is in line with that of the court house. Apparently the charge-room and parade-room must be used as passages from the court house to the rest of the police department. The fire station forms a somewhat similar continuation to the right of the court house, having also two stories, the upper of which contains the firemen's recreation-rooms. The superintendent's house is at the extreme right of the front. The hose tower is placed in the back portion of the front block, and is approached by a passage from Duke-street; we did not notice any provision for the fire-escape, and the stables are only top-lighted. Thirteen cottages front Duke-street; the other six are placed in the centre of the site, and form part of one side of the drill yard. The cottages are planned the wrong way about, the principal entrances (in Duke-street) opening into the sculleries, while the back entrances open into the parlours.

There are many good points in the plans, but they are more than counterbalanced by the defects and by the unsatisfactory grouping of the buildings on the site. The external design is also far from pleasing, the long, low frontage having a monotonous effect, and the central tower being heavy and not worthy of its author.

Messrs. Cheers & Smith (No. 2) submit a design in Mr. Cheers's usual type of German Renaissance—somewhat too exuberant, but undoubtedly effective. The court house, which (with the police department) forms a detached building in the left-hand half of the principal frontage, has a central raised portion with high-pitched roof surmounted by a clock turret, and has low domed towers at the ends and picturesque gables between. The principal entrance to the courts is in the centre of the group, and is approached by right and left external flights of twenty-four steps. It opens into a hall 48 ft. by 21 ft. 6 in., from which the two courts, summons office, and other rooms are entered. Separate external entrances are provided for access to the galleries of the courts, but the position of the courts on the first floor necessitates a great number of steps for access to the galleries. The magistrates', clerk's, and other rooms are to the left and back of the courts, while the police department is principally on the ground floor, an entrance being provided under the principal entrance. The fire station is in the [illegible] hand portion of the frontage, with the hose-tower and fire-escape shelter to the left of the engine-room, and the superintendent's house in the right hand corner of the site. The stables are at the back of the engine-room, opening, of course, directly into it at the head of each stall, and are well lighted from the back. The firemen's cottages are all arranged along Duke-street, and are conveniently planned. The corridors of the police department are inadequately lighted, and there is no airing-yard for the prisoners; but the design as a whole is a good one, both as regards plan and elevations.

Design No. 3, by Mr. J. Glenn Gibson, of London, shows careful planning in the court-house block; the police department on the ground floor of this building is especially meritorious. Two airing yards are provided for male and female prisoners respectively, and the waiting-rooms for prisoners are conveniently placed at the foot of the stairs to the docks, and are separated from the corridor by iron railing and gates. The end of this block towards Blakey Moor has a segmental central projection after the manner of Mr. Mountford's design for the Liverpool Museum. The elevations are of a rather heavy type of English Renaissance, and the effect of the central portion (comprising the two courts), which is

carried up as a plain attic behind the balustrade over the front cornice, is not pleasing. The fire station as a whole is less satisfactory in plan. The Superintendent's house is on the first floor over the engine-room, and three of the cottages are in the central yard, forming (with two loose boxes, &c.) a detached block.

Design No. 4 is a credit to its authors, Messrs. Sames & Green, of Blackburn, the exterior of the court-house building (in a good type of English Renaissance) being one of the best submitted. The front has a central projection with coupled columns and pediment, and the principal entrance is in this projection and has rusticated columns and a segmental pediment broken in the centre, above which is a window with arched head. The cornice extends at one level along the whole of the front and is surmounted by a balustrade. The plan has several features in common with the successful design, notably the method of arranging the public galleries of the courts as a series of steps rising from the floor of the court, and not as proper galleries. The entrance hall is on the same level as the courts, but the corridors to the right and left of the hall are raised eight steps above this level, and entrance to the galleries of the courts is obtained from these corridors. The arrangement of the fire station is good, but does not call for particular comment. Only eighteen firemen's cottages are provided.

The accepted design (No. 5) is the joint production of Messrs. Briggs & Wolstenholme and Messrs. Stones & Stones, of Blackburn, and there can be little doubt that it is the best design submitted. The plans and elevations are good, the necessary accommodation has been provided (and a little more), and the architect's estimate is 27*l.* 10s. below the limit of cost. The court house block is in the left-hand portion of the front, and the principal entrance is in the centre. This entrance takes the form of a recessed porch, from which flights of five steps lead to right and left vestibules of the same width as the steps; behind these is the entrance hall, 54 ft. long and 19 ft. from front to back. From the back of the hall a wide flight of six steps leads down to a lobby, on either side of which are the principal entrances to the two courts. This lobby has windows opening into an area which separates the back parts of the courts. The galleries of the courts are on the same level as the entrance hall, and are entered therefrom. The witnesses' waiting hall is small, and forms a passage from the entrance hall to the chief constable's Department on the right. There is only one solicitors' room, but this can easily be divided by a partition into two rooms of suitable size. The female witnesses' room and conveniences are in the basement, and adjoining them are other conveniences, presumably for male witnesses and others. The front of the building has two other entrances, one on each side of the principal entrance, that to the left being for the magistrate's clerk and other officials, and that to the right being the entrance to the chief constable's department. The magistrate's private entrance is well placed at the end of the building, in the street known as Blakey Moor. The grand jury room is on the first floor over the entrance hall and vestibules. The chief constable's department is to the right of the courts and corresponds externally with the magistrate's department to the left of the courts. The principal portion of the police department is, however, in a detached building in the rear of the courthouse, but parallel to it, and approached (on the first floor) by a bridge from the chief constable's corridor. The police-van entrance is from Blakey Moor along a passage or yard between the courthouse and the detached police block. The cells are well arranged, and attached to them is an airing-yard for prisoners, with a photographic-room overlooking one corner of it, so that snapshots of the prisoners can be taken without their being aware of it. To the right of the courthouse building is a range of store-rooms, &c., with the end to Northgate, and then follow, in order, the entrance to the drill-yard, hose-tower, and fire-escape shelter, superintendent's house, engine-room, and two firemen's cottages of rather better class than the seventeen in Duke-street. The cleaning shed is placed behind the hose-tower and superintendent's house. The stables are behind the engine-room, and have windows along the back, and over the stables are a hay-loft and the firemen's recreation-rooms; a sliding pole leads down from the large recreation-room to the stables.

According to the author's report, which, by the way, is the only report exhibited with the drawings, the design is in a "somewhat restrained English Renaissance style." The court-house block consists of a central recessed position of rusticated masonry on the ground story with five equal arches, the central one being for the porch of the principal entrance. The upper story is of brick with stone columns between the windows, stone dressings to the windows, and stone cornice and balustrade. On either side of the central portion are projecting pavilions with segmental pediments, and covered with eight-sided cupolas or domes, surmounted by ventilation-turrets. At the two extremities of the front are the one-storied buildings of the magistrates' and chief constable's departments. The fire station is scarcely so satisfactory, but the general effect is decidedly good and is admirably shown by the clever wash perspective.

The sixth design, by Messrs. Woodhouse and Willoughby, of Manchester, is not equal to their usual work. The corridors on the lower ground floor are almost entirely dark; what would be the use of the prism-lights, shown in the floors of the almost equally dark corridors above we really cannot say. The external design is more satisfactory than the planning, but is, we think, somewhat too ambitious for the amount of money to be spent. The arrangement of the buildings on the site follows in the main that adopted by the majority of the competitors.

It will have been gathered from this brief review that the designs as a whole reach a high standard of merit, and the Corporation of Blackburn is, we believe, thoroughly satisfied with the result of the competition. The assessor, Mr. Bromley, has carried out his duties remarkably well.

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—The third Technical Demonstration was held at Sir Richard Martin's large timber stores, Rogerson's Quay, Dublin. About forty members attended and were received by Mr. Alston, who proceeded to give a most instructive lecture on the varieties and qualities of timber. His remarks on the conversion of the log into market sizes were illustrated by numerous diagrams, and practical information as to the defects in timber was conveyed by specimens obtained for the purpose. With reference to the difficulty of obtaining widths of over 13 in. in softer woods, Mr. Alston showed some examples of fir from British Columbia 2 ft. 6 in. wide and 6 in. thick, and almost 40 ft. long. A hearty vote of thanks to the lecturer for his interesting remarks terminated the demonstration, which lasted two hours.

SHEFFIELD SOCIETY OF ARCHITECTS.— On the 14th inst. Mr. H. Stannus attended the usual meeting of the Sheffield Society of Architects and Surveyors at the School of Art and gave a lecture on "Athenian Buildings." Mr. J. Smith presided. A vote of thanks was accorded to Mr. Stannus, on the motion of Mr. C. Hadfield, seconded by Professor Anderson. A ballot was taken and the following gentlemen were elected:—Fellows, Messrs. W. J. Hale and H. L. Paterson; associates, Messrs. G. R. Morris and H. W. Inott; students, Messrs. H. W. Wilson and J. Miller. Three gentlemen were nominated for membership.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—At the meeting of this Society, held at the Westminster Palace Hotel, on December 14, the Chairman, Mr. Percival Marshall, A.I.Mech.E., presiding, a paper on "The Metallurgy of Tin" was read by Mr. J. H. Davy James, Member, of Swindon. In briefly reviewing the history of the subject, the author remarked that tin was without doubt one of the articles of commerce of the Phœnicians, who obtained it from Britain and from that part of the British Isles now known as Cornwall and Devon. Several charters were given to the Cornish mines, and in the reign of Edward I. the Stannary laws were instituted, some of which are even now in force. England enjoyed the monopoly of the tin trade up to the eighteenth century. In the early part of that century tin was discovered in Bohemia and in the island of Banca. Mines of tin are fairly widely distributed over the earth's surface, being found in the Malay Peninsular, Australia, United States, Mexico, Chili, and Brazil. Europe contains workings at Saxony, Austria, Gallicia, and Vauby in France. The chief mining district in England lies between Truro and Land's End in Cornwall, the most important mine being Dolcoath, which is now 600 fathoms deep and employs 1,500 hands. Although retaining a great deal of old-fashioned plant, it has kept well up to date, and now possesses effective batteries of Californian Stamps and about forty Frue Vanners for dressing the ore. The chief ore of tin, "tinstone" ($Sn.O_2$, sp. gr. 6·9), is found in regular veins or lodes, and also in alluvial formations. The author described some of the appliances peculiar to Cornish tin mining, viz., ladder-ways, man-engines, cages, and skips. The dressing of ores, including stamping, washing, and calcining, were next treated, special reference being made to the Californian Stamp, which was gradually displacing those of the old Cornish type, the main features of both, however, being similar. The important advantages obtained by the use of Frue Vanner concentrating machines, as compared with the old processes of buddling and racking, were pointed out. Calcining was effected in a Brunton's calciner, in the form of a reverberatory furnace, the bed being a circular cast-iron table, 10 ft. diameter, and revolving three or four times per hour. The process of calcination eliminated arsenic and sulphur, the former condensing in flues which were cleaned out every three or four months, the white arsenic formed being saleable. Ores containing wolfram received special treatment, being roasted in a furnace with sulphate of soda, forming sodium tungstate, which was then dissolved in water, leaving tin as a residue. The author then proceeded to describe the reverberatory furnace in which the ore is melted after being mixed with anthracite and a little lime. The first operation took about seven hours. The metal was then tapped, but was still in a very impure state, and had then to go through the refining processes of liquation and boiling. A description of the blast-furnace used in Saxony followed, and it was stated that the loss by this method was about twice as great as that by the English method. The Cornish method of assaying tin ores was then touched upon, and the various properties of the metal were dealt with, including tenacity, ductility, and conductivity, with reference to heat and electricity; its industrial applications were considered; the process of tin plating was described, and reference made to tests applied to tin plates to ascertain their quality. The various alloys of tin and copper were fully dealt with—bronze, gun-metal, bell-metal, speculum metal, &c. Phosphor-bronze and its uses in engineering were entered into, and the paper concluded with questions relating to the application of tin to the manufacture of fusible alloys. A discussion followed the reading of the paper, and a vote of thanks having been accorded the author, the proceedings closed with the announcement of the ensuing meeting on January 25 when a paper on "Railway Construction" would be presented by Mr. Alexander Ross, engineer to the Great Northern Railway.

CIVIL ENGINEERS' ASSOCIATION, ABERDEEN.—At a meeting of those interested, held in Gordon's College on December 14, it was agreed to incorporate the members of the civil engineering profession in the city and district into an association. Mr. James Barron, C.E., presided, and the leading resolution was proposed by Mr. G. Gordon Jenkins, C.E., and seconded by Mr. R. G. Nicol, C.E. Mr. W. Simpson, assistant harbour engineer, Aberdeen, was appointed hon. secretary.

COMPETITIONS.

ALMSHOUSES, GILTBROOK, NOTTS.—In a limited competition for almshouses, Giltbrook, Notts, the design submitted by Mr. A. R. Calvert, Nottingham, has been placed first by the assessor, Mr. A. N. Bromley, and the trustees have accepted his award. The first block of eight houses are to be proceeded with immediately.

SCHOOL, DALKEITH, EDINBURGH.—A new Burgh school is to be erected on the site of Mushet's Iron Works, Dalkeith. Mr. T. T. Paterson, of Edinburgh is the architect.

WORKING RULES FOR BRICKLAYERS IN THE LONDON DISTRICT.

THE following is the complete list of the working rules for bricklayers recently agreed upon between the London Master Builders' Association and the Operative Bricklayers' Society :—

"1. That the working hours in summer shall be fifty per week for forty weeks.

That during twelve weeks of winter, commencing on the second Monday in November, the working hours shall be for the first three weeks and the last three weeks forty-seven hours per week, and during the six middle weeks forty-four hours per week.

HOURS OF LABOUR.

SUMMER.	WINTER.
For Forty Weeks.	*For Twelve Weeks.*
First five days of each week, 6.30 a.m to 8 a.m., 8.30 a.m. to 12 noon, 1 p.m. to 5 p.m.	For three weeks commencing the second Monday in November :—
Saturdays, 6.30 a.m to 8 a.m., 8.30 a.m. to 12 noon.	First five days of each week, 7 a.m., to 8 a.m., 8.30 a.m. to 12 noon, 12.30 p.m to 4.30 p.m.
Equal to fifty hours per week.	Saturdays, 7 a.m. to 8 a.m., 8.30 a.m. to 12 noon.
	Equal to forty-seven hours per week.
	For the next six weeks :—
	First five days of each week, 8 a.m. to 12 noon 12.30 p.m. to 4.30 p.m.
	Saturdays, 8 a.m. to 12 noon.
	Equal to forty-four hours per week.
	For the following three weeks :—
	First five days of each week, 7 a.m. to 8 a.m., 8.30 a.m. to 12 noon, 12.30 p.m. to 4.30 p.m.
	Saturdays, 7 a.m. to 8 a.m., 8.30 a.m. to 12 noon.
	Equal to forty-seven hours per week.

2. That the present rate of wages shall be advanced *one halfpenny* per hour, *commencing on January 1, 1901.*

3. That overtime when worked at the request of the employers, but not otherwise, shall be paid at the following rates, namely :—From leaving-off time until 8 p.m., time and a quarter ; from 8 p.m. to 10 p.m. time and a half ; after 10 p.m., double time. No overtime shall be reckoned until each full day has been made, except where time is lost by stress of weather. On Saturday the pay for overtime, from noon to 4 p.m., shall be time and a half ; and after 4 p.m., and Sunday, double time. Christmas Day shall be paid for the same as Sunday.

Workmen engaged on a night gang shall be paid one penny per hour in addition to the ordinary rate of wages.

4. That one hour's notice be given or one hour's time be paid by either side, on determining an engagement. All wages due shall be paid at the expiration of such notice, or walking time if sent to yard.

In the event of more than *ten per cent.* of the workmen of the trade employed at the job giving notice to leave during any one day (except Saturday), they shall not be entitled to receive their money until noon on the following day.

5. That men who are sent from the shop or job including those engaged in London, and sent to the country, shall be allowed as expenses, 6d. per day for any distance over six miles from the shop or job ; exclusive of travelling expenses, time occupied in travelling, and lodging money.

6. That payment of wages shall commence at noon, or as soon thereafter as practicable, on Saturday, and be paid on the job. But if otherwise arranged, walking time at the rate of three miles per hour shall be allowed to get to the pay table at twelve noon.

7. That employers shall provide, where practicable and reasonable, a suitable place for the workmen to have their meals on the works, with a labourer to assist in preparing them.

8 That wages earned after leaving-off time on Friday, and Saturday only shall be kept in hand as back time.

9. That the term "London district" shall mean twelve miles radius from Charing Cross.

10. That if application be made to any employer by the Central Committee of the Operative Bricklayers' Society to discharge any workmen on the ground that such workman is obnoxious, and the employer refuses to accede, no strike shall be sanctioned, but the question shall be referred to the decision of the Board of Conciliation. Provided always that no such application shall be made in consequence of such workman belonging or not belonging to any trade society.

CONCILIATION RULE.

(*a*) For the adjustment of all disputes and to avoid stoppage of work, it is agreed that upon a difference arising between an employer, or upon the works of an employer, and any of his workmen from any cause whatever, notice shall be given by the Association or Society of the complaining party to the Association or party representing the other side, and the subject matter of dispute shall thereupon be referred to the Board of Conciliation which shall be summoned within seven days, and, if practicable, shall give its decision within the next six working days, proceeding in the following manner :

(*b*) For all purposes of the foregoing rules the Board of Conciliation shall consist of three members nominated by the employers and three by the workmen. Each party shall send to the other within one week from the date of signing these rules and within one week from January 1 in each year, the names of six persons from whom three shall be selected to act as their representatives on the Board of Conciliation for the current year ending December 31, and in the event of the death or resignation of any member, either party shall appoint another member within one week, notice being given thereof. The number of representatives of the employers and of the workmen on the Board of Conciliation shall always be equal and shall be so maintained during the sitting.

(*c*) The Board of Conciliation so constituted, if unable to agree, shall make application to the Board of Trade under the "Conciliation Act, 1896," or apply for the appointment of a person to act as conciliator.

The Board of Conciliation shall have power to decide all questions arising between the employer and the workmen, including any questions between one trade and another as regards demarcation of labour or other matters, provided that for the decision of any question involving claims or rights of other sections of the building trades a Joint Conciliation Board shall be constituted of the three representatives nominated by each trade involved and by a similar number of representatives of the employers, so that members on the Joint Conciliation Board may be specially represented on such board, and so that the number of representatives of the employers and of the workmen on such Joint Conciliation Board shall be equal and be so maintained during the sitting.

(*d*) A Joint Conciliation Board shall have the like powers as a Conciliation Board and shall be regulated in the same manner.

(*e*) The Conciliation Board or a Joint Conciliation Board shall have power to make such rules and regulations for the transaction of business as they may approve.

(*f*) In the event of an application being made to the Board of Trade or a person being appointed as Conciliator the decision of such person or the Conciliation Board shall be final and binding on both parties.

N.B.—Throughout these rules *Employer* means a Member of the London Master Builders' Association, and *Workman* means a Member of the Operative Bricklayers' Society.

11. That six months' notice on either side shall terminate the foregoing rules.

Signed on behalf of the Bricklayers on December 11, 1900.

Signed on behalf of the L.M.B.A. on December 11, 1900.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday in the County Hall, Spring-gardens, Alderman W. H. Dickinson, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend the Battersea Borough Council 7,860*l.* for street improvement, 3,395*l.* for paving and sewer works, and 20,000*l.* for electric lighting purposes ; the Woolwich Borough Council 20,000*l.* for electric lighting and dust destructor works ; and the Paddington Guardians 5,900*l.* for the provision of a home for children.

Rise in Wages.—The same Committee reported that they had received a request from the Footway Masons' and Carriageway Paviors' Trade Protection Society, asking that the Council's list of rates of wages and hours of labour might be amended by increasing the rate of wages of granite sett paviors from 9d. to 10d. per hour. There was, the Committee stated, no association of paviors' employers, and no rate had been agreed upon by masters and men, but from inquiries made they had ascertained that the rate in practice obtained for this description of work was 10d. per hour. They therefore recommended that the Council's list of rates of wages and hours of labour be amended by increasing the rate of wages of granite sett paviors from 9d. to 10d. per hour.

This was agreed to.

The Works Department.—The Finance Committee brought up the half-yearly return of works completed by the Department. These showed an estimated cost for eighteen works of 53,148*l.*, and a final cost of 53,303*l.*—a deficit of 155*l.* The approximate expenditure on estimated works for the half-year was 152,000*l.* Out of the eighteen works completed during the past half-year, ten have been executed at less cost than the respective estimates as finally revised, and the resulting saving to the Council works out at 2,746*l.* 13s. 4d. On the other hand, eight jobs have cost altogether 2,901*l.* 15s. 4d. more than the final estimates. It was stated that the amount of work done by the Department since its creation had cost 1,137,242*l.* 14s. 2d., or 64,694*l.* 17s. 11d. above the final estimate. The works commenced under the direction of the present management and completed during the past three and a half years show the following result :—Final estimates, 278,577*l.* 11s. 2d. ; actual cost, 272,018*l.* 4s. 4d. — showing a saving of 6,539*l.* 6s. 10d., or 2·35 per cent.

At the present time the Department has twenty-four works in progress (exclusive of jobbing works), representing a total estimated cost of 571,056*l.*, the principal items being :—

Work.	Amount of Estimate.	Approximate Expenditure to Sept. 30, 1900
	£	£
Horton Asylum.....	288,745	223,930
Hackney-wick	123,800	93,824
North Woolwich drainage	48,000	59,438
Barking sludge tanks	20,550	19,866
Six fire brigade stations..	45,387	28,074
Artisans' dwellings (Wellesley Buildings)	17,450	9,470

There are also nine other works not begun on September 30 ; the estimates for these works amount to 43,266*l.*

Mr. Bruce suggested that the discussion might be adjourned pending complete Reports from different Committees.

Mr. Cousins said that while the apparent deficiency was not large, yet there had been many instances where the Works Department had refused to do the work because they considered the estimate too small ; and yet, when given out to contractors, a saving on the architect's estimate had been effected. Yet, bearing in mind that the Department only took work where they considered the architect's estimate sufficient, still there was a deficiency of 155*l.* In seven works out of the eight carried out for the Main Drainage Committee there was a loss amounting to about 2,000*l.*, while on the eighth job there was a profit of 1,900*l.*—a very useful balance. On the whole of the work carried out since the inception of the Department there was a loss of 64,600*l.*, so that now the Department stood in the position of an undischarged bankrupt.

Mr. Dew contended that the Report was satisfactory, inasmuch as a great deal of the work was done under a schedule of prices which was framed years ago, when both materials and labour were much cheaper.

The Report was then adopted.

Asylums and Drainage By-Laws.—The Public Health Committee recommended that the Local Government Board be informed that in the opinion of the Council no useful object would be served by exempting lunatic asylums in London from the Council's proposed by-laws as to drainage, and that it should be pointed out to the Board that the drains of those buildings would, even if exempted from the by-laws, still remain subject to the control of the sanitary authorities under the Metropolis Management Act, 1885.

This was agreed to after discussion, as also were the following recommendations :—

"That the Local Government Board be informed :—

(*a*) That the Council has nothing to add to its letter of November 13, 1899, with regard to Mr. Mark Judge's letter respecting the drainage by-laws.

(*b*) That in the opinion of the Council it is not desirable that the confirmation of the by-laws should be delayed in order that they may be considered by the Councils of the metropolitan boroughs, seeing that the vestries and district boards were given the opportunity of making suggestions on the draft, and that their observations have been carefully considered."

Housing Poor Persons.—The Housing of the Working Classes Committee recommended :—"That the estimate of 12,500*l.* submitted by the Finance Committee be approved, and that the Council do acquire, under Part III. of the Housing of the Working Classes Act, 1890, a site consisting of about 1¼ acres abutting on Wedmore-street, Holloway-road, Islington."

Mr. Beachcroft moved as an amendment to add the following words :—"For the erection of dwellings to accommodate persons resident in the immediate neighbourhood whose earnings did not exceed 30s. a week."

Dr. Forman seconded the amendment.

Mr. Waterlow (Chairman of the Committee) said that the suggestion was impractical.

The amendment was defeated and the recommendation agreed to.

The Archbishop's Park.—The Parks and Open Spaces Committee recommended, and it was agreed, that the Council do approve the estimate submitted by the Finance Committee, and do authorise a further expenditure of 2,277*l.* for the completion of the laying out works at the Archbishop's Park, in order that the grounds may be made fully available for use by the public next year.

Homes for Female Inebriates.—On the recommendations of the Inebriates Acts Committee, it was agreed that 20,000*l.* should be spent in the construction of additional buildings for the accommodation of eighty female inebriates on the Farmfield Estate.

Site Values (London) Rating Bill.—Mr. Cornwall moved the adoption of the Joint Report of the Parliamentary and Local Government and Taxation Committees, which recommended that the Sites Values (London) Rating Bill be approved and introduced in the next Session of Parliament. He said that the Bill was for the taxation of ground values. The estimated site value of the County of London was 16,000,000*l.*, and that Bill proposed to levy a rate of 2s. in the £ on the persons enjoying the income from site values. If the Bill was brought into operation, it would mean an income of 1,600,000*l.* per annum. The occupying ratepayer of London paid last year 11,000,000*l.* in rates, and a large portion of that went to maintain the high value of sites. It was proposed by the Bill to use the existing machinery of the Assessment Committees as far as possible, and those Committees would determine the gross rateable value of the sites.

Mr. P. Harris said the Bill must apply to all towns, and was one which must be drafted by the Government. The Government had considered the matter, and had appointed the Royal Commission on Taxation, which would, no doubt, formulate practical proposals. He considered that it was not the time to move in the matter, and he characterised the Bill as a "humbugging Bill." He moved, as an amendment, "That, inasmuch as the Bill lays down no rules to guide the valuer in fixing site values, and does not define the person on whom the rate is to be levied, whether freeholder, leaseholder, or occupier, and overrides existing contracts, the Bill be referred back to the Committee for further consideration."

Mr. Cousins seconded the amendment, which, after a long discussion, was defeated, and the recommendation was agreed to.

Theatres, &c.—The following recommendations of the Theatres and Music Halls Committee were agreed to :—

Deviations as to plans, Athenæum, Shepherd's Bush (Messrs. J. T. Wimperis & Arber).

Alterations for purpose of erecting an organ in the large hall, Battersea Town Hall (Mr. J. T. Pilditch).

Formation of an electric meter chamber by utilising part of the gentlemen's lavatory on the prompt side of the pit level at the Camden Theatre, High-street, Camden Town (Mr. W. G. R. Sprague).

Enlargement of the porter's box at the Coronet Theatre, High-street, Notting Hill-gate, by utilising a corner of the adjacent dressing-room (Mr. W. G. R. Sprague).

Cigar-counter, corner of the o.p. side of the stalls, Euston Theatre of Varieties (Messrs. Wylson & Long).

Restoration after fire of the Grand Theatre, Islington.

The Imperial Hall proposed to be erected at Grove-vale, East Dulwich (Mr. J. W. Brooker).

An alteration in the position of the step leading from the pit to the ladies' lavatory, and also a proposed alteration to the o.p. corridor from the stalls at the London Pavilion, Piccadilly (Messrs. Wylson & Long).

The new Gaiety Theatre, which it is proposed to erect at the junction of the Strand with the west spur of the proposed new road from Holborn to the Strand. The theatre will have seating accommodation for about 1,259 persons, and the plans show that the regulations will be complied with in all respects (Messrs. E. Runtz & Co.).

An artist's room and a private box for the use of the management at Paddington Baths, Queen's-road, Bayswater (Mr. E. B. B. Newton).

An alteration to the pit refreshment saloon at the Tivoli Music Hall, Strand, by cutting off a portion of the counter and building a 9-in. wall across to form a cellar space (Mr. W. Emden).

Tramways.—Replying to Mr. Baker, Mr. Benn said the Highways Committee had not received any reply from the North Metropolitan Tramways Company as to the price at which they would be prepared to sell their lease to the Council.

It was agreed, on the recommendation of the Highways Committee, to advertise for an Electrical Engineer, at a salary of 1,000*l.* a year, to superintend the reconstruction for electrical traction of the whole of the tramways under Dr. Kennedy.

Street Improvement.—It was agreed to contribute one-third of the net cost of the widening of Great Church-lane, between Fulham Palace-road and No. 61, Great Church-lane, such contribution not to exceed the sum of 4,300*l.*

St. Martin's-place.—The Improvements Committee reported as follows :—

"The Council, on November 27, 1900, had before it a Report submitted by us upon a proposal for the widening of St. Martin's-place by the alteration of the steps in front of St. Martin's Church. We recommended that, subject to the Council of the City of Westminster agreeing to retain the platform in the steps on the southern side of St. Martin's Church, the London County Council should contribute, on the usual conditions, one-third of the net cost of the reconstruction of the steps in front of St. Martin's Church in such a way as to increase the width of the footway on the eastern side of St. Martin's-place to about 9 ft., as proposed by the Local Authority, such contribution not to exceed the sum of 270*l.* The Council, however, after debate, did not adopt our recommendation, but passed a resolution as follows :—'That in view of the Report of the Royal Institute of British Architects, this Council is not prepared to take the responsibility of sanctioning the proposed alterations of the steps of St. Martin's Church by contributing any part of the cost.'

We communicated this decision to the Council of the City of Westminster, who have now informed us that they 'have authorised the Surveyor to complete the work subject to the platform on the steps upon the southern side of the church being retained.' It will be observed that the action of the Council in taking the opinion of the Royal Institute of British Architects has not been without effect. We report the facts for the information of the Council."

Tenders.—Tenders for the following works have been accepted :—

Trial boring on the Claybury Estate.—Messrs. Isler & Co., 825*l.*

Supply and erection of an iron and glass roof at the chief Fire Brigade station.—Messrs. Helliwell & Co., 149*l.*

Axles and wheels for steam fire-engines.—Messrs. Shand, Mason, & Co., 222*l.* 14s.

Electric light lamp-standards, Victoria Embankment and Westminster Bridge.—Messrs. Macfarlane & Co., 178*l.* 10s. 6d.

Repair of pumps, Western Pumping Station.—Messrs. R. Moreland & Son, Limited, 243*l.* 18s.

Supply of two propeller tail shafts for the s.s. *Barking*.—Messrs. Clayton, Goodfellow, & Co, Limited.

The Council rose at a quarter to eight and adjourned until January 22.

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

AT the meeting of the London County Council on Tuesday the following applications under the 1894 Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated :—

Lines of Frontage.

Islington, South.—A wall and railing to the goods yard on the north side of Barford-street, Liverpool-road, Islington (Mr. R. Venner for the Royal Agricultural Hall Company, Limited).—Consent.

Fulham.—A house on the north side of Gunterstone-road, Fulham, to abut upon Glazbury-road (Mr. W. Cave for Messrs. Squire & Potter).—Consent.

Peckham.—One-story shops in front of Nos. 168, 170, and 172, Rye-lane, Peckham (Mr. W. L. Dowton).—Consent.

Wandsworth.—A block of residential flats, with shops on the ground floor, on the south side of Lower Richmond-road, Putney, at the corner of The Platt (Messrs. Palgrave & Co. for Mr. G. Crowden)—Consent.

Woolwich.—That the application of Mr. R. Stewart, for an extension of the periods within which the erection of eighteen houses on the north side of Bexley-road, Eltham, eastward of Elderslie-road, was required to be commenced and completed, be granted.—Agreed.

Hackney, North.—Eight houses, with bay windows, on the east side of Upper Clapton-road, Hackney, between No. 174 and Moresby-road (Mr. G. H. Paine for Mr. C. C. Paine).—Refused.

Woolwich.—Four houses at the south-east end of Elm-grove, The Slade, Plumstead (Mr. A. E. Habershon for Mr. J. Stevens).—Refused.

Projections.

Poplar.—A lamp at the side of the Horns and Chequers public-house, Thames-place, Limehouse, to overhang the public way of Thames-passage (Mr. J. R. Johnston for Messrs. Taylor, Walker, & Co.)—Consent.

Dulwich.—The retention of a wood and tile portico at the entrance to No. 11, East Dulwich-road, Dulwich (Mr. G. Kemp for Mr. J. H. Keene).—Consent.

Dulwich.—Wood and tile pents over the entrances to Nos. 1, 3, 5, and 7, Victoria-gardens, Croxted-road, Dulwich (Mr. F. N. Kemp for Mr. F. H. Morley)—Consent.

St. George, Hanover-square.—A bay window and balcony in front of No. 1, Charles-street, Berkeley-square (Mr. R. G. Hammond, for Mr. J. Garlick—Consent,

St. Pancras, North.—Balconies and four-story bay windows to twenty-four blocks of residential flats in Lissenden-gardens, Highgate-road, St. Pancras, some of which bay windows will exceed in height the width of the street (Messrs. Boehmer & Gibbs for Mr. A. W. Armstrong).—Consent.

St. Pancras, West.—A bay on the flank of No. 10, Cambridge-terrace, Regent's Park, St. Pancras, to abut upon Cambridge-place (Mr. W. D. Caröe for the Misses Barron).—Consent.

Westminster.—A wood and glass porch at the entrance to No. 137, Victoria-street, Westminster (Mr. E. Stones for Mr. A. Simner).—Consent.

Greenwich.—An illuminated sign and two arc-lamps overhanging the public way at the Parthenon Theatre, Nevada-street and Croom's Hill, Greenwich (Mr. E. E. Fetch for Mr. G. C. Best).—Refused.

Width of Way.

Hoxton.†—A boundary fence in front of a workshop on the north side of Hobb's-place, Hoxton-street, Shoreditch, such boundary fence to be at less than the prescribed distance from the centre of Hobb's-place (Mr. G. R. Cherry).—Consent.

Fulham.—The rebuilding of Nos. 9 and 11, Fane-street, North End-road, Fulham (Mr. W. L. Eves for Mr. W. Garner).—Consent.

Fulham.—Additions to the Walham Green Sanitary Laundry at less than the prescribed distance from the centre of Garden-row, Fulham-road, Walham Green (Mr. A. Howard for Mr. A. Chubb).—Refused.

Deviation from Certified Plan.

St. George, Hanover-square.—Deviations from the plan certified by the District Surveyor, under Section 43 of the Act, so far as relates to the proposed rebuilding of No. 1, Charles-street, Berkeley-square (Mr. R. G. Hammond for Mr. J. Garlick).—Consent.

Line of Frontage and Width of Way.

Kensington, South.—A two-story workshop in Thurloe-mews, Alfred-place East, Kensington (Mr. H. P. Drew for Messrs. W. D. Hodges & Co., Limited).—Refused.

Gangways Across a Street.

Southwark, West.—The erection across Pump-court of two iron gangways to connect at the first and third floor levels, Nos. 120 to 128 with Nos. 114 to 118, Union-street, Southwark (Messrs. F. Chambers & Son for the General Electric Company, Limited).—Consent.

Width of Way and Construction of Buildings.

Wandsworth.—A covered loading-stage and other buildings at Gothic Wharf, Brewhouse-lane, Putney, with such loading-stage and two of the buildings and the boundary fence at less than the prescribed distance from the centre of Brewhouse-lane (Mr. S. J. May for Messrs. Carlo Gatti & Stevenson)—Refused.

Formation of Streets.

Clapham.—A variation from the plan sanctioned on May 22, 1900, for the formation of a new street, to be named Navy-street, to lead from Manor-street to Elmhurst-street, Clapham, so far as relates to an alteration in the trace of such street (Mr. C. Grey St. John).—Consent.

Clapham.—A variation from the plan sanctioned on May 3, 1898, for the formation of a new street, to be named Voltaire-street, and to lead from Manor-street to Elmhurst-street, Clapham, so far as relates to an alteration in the trace of such street (Mr. C. Grey St. John).—Consent.

Hampstead.—That an order be issued to Mr. C. J Bentley sanctioning the formation or laying-out of a new street for carriage traffic, to lead from Haverstock-hill to Glenilla-street, Hampstead (for Mr. J. C. Hill and Mr. Bentley). That the name Glenloch-street be approved for the new street.—Agreed.

Dwelling Houses on Low-lying Land.

Greenwich.—Five buildings, to be used wholly or in part as dwelling-houses, on low-lying land situated on the east side of Glenforth-street, Lower Woolwich-road (Mr. E. Hoole, for Mr. J. Lidgett).—Consent.

The recommendation marked † is contrary to the view of the Local Authorities.

METROPOLITAN ASYLUMS BOARD.

THE fortnightly meeting of this Board was held at the offices of the Board, Thames Embankment, on Saturday, Sir E. Galsworthy presiding.

The Works Committee reporting upon Bridge School, Witham, stated that on November 17 they were instructed to consider and report to the Board as to the discrepancy between the surveyor's estimate (650*l.*) and the tender accepted (255*l.*) for cleaning, painting, and other works. The surveyor now wrote that the extraordinary difference in prices was probably due to the fact that the work in question, being largely of a repairing character, it was difficult to estimate with any degree of accuracy, especially as time did not permit of quantities being taken out. The Committee pointed out that the tender accepted and the two next lowest tenders were from country builders, and that the prices at which they would tender at this season would probably be considerably below the normal London prices on which the surveyor was accustomed to estimate. The average amount of the ten tenders received, which ranged from 255*l.* to 627*l.* 18*s.*, was 445*l.* The report was adopted.

BOOKS RECEIVED.

ART CRAFTS FOR AMATEURS.—By Fred Miller. (H. Virtue & Co.)

PRACTICAL LESSONS IN METAL TURNING. By Percival Marshall. (Dawbarn & Ward.)

THE EMPLOYERS LIABILITY ACT AND WORKMEN'S COMPENSATION ACTS. By Alfred H. Ruegg, Q.C. Fifth Edition. (Butterworth & Co.)

EVERY MAN'S OWN LAWYER. By a Barrister. Thirty-eighth Edition. (Crosby Lockwood & Son).

WORKS IN ARCHITECTURE OF ROBERT AND JAMES ADAM. Reprinted by E. Thézard. Book II.

ARCHITECTURAL POTTERY. By Leon Lefêvre. Translated from the French. (Scott Greenwood & Co.)

HANDBOOK FOR TRAVELLERS IN LOWER AND UPPER EGYPT. Tenth edition, revised. Edited by Mary Brodrick, Ph.D. (John Murray.)

A SHORT HISTORY OF RENAISSANCE ARCHITECTURE IN ENGLAND. Abridged edition. By Reginald Blomfield, M.A. (Geo. Bell & Sons)

Correspondence.

To the Editor of THE BUILDER.

ROYAL ACADEMY ARCHITECTURAL DESIGNS.

SIR,—With reference to your remark on the absence of the points of the compass on the plans for "a country parsonage," may I point out that the criticism of the visitor or instructor is made on the original sketches, where the points are shown. In working out the final drawings (sometimes to a large scale) the students often neglect to show them, apparently forgetting that they are the principal element in determining the real value of the plan.

R. PHENÈ SPIERS.

OLD ST. DUNSTAN'S-IN-THE-WEST.

SIR,—To the interesting particulars set forth in the "Note" in your last number, page 533 *ante*, might be added a reference to your own columns of April 25, 1885, containing the late Wm. Loftus Brock's remarks upon the earlier foundations, with an illustration after that of 1737 in West and Toms's "Perspective Views," and to the almost identical cut in the *Mirror*, Vol. XIV. The alcove for the two bells and the two "wild men" was erected upon the flat roof of the St. Katharine's chapel which Thomas Duke built in or about 1421. The clock, the alcove with the figures and bells, and two statues from Lud Gate were re-erected at "St. Dunstan's," outer circle, Regent's Park, built in 1833-6 by Decimus Burton for the Marquis of Hertford, who bought the relics for 200 guineas. The bells may still be heard and, at this season of the year, seen from the park. The "1327" of Mr. Arthur Hawley's account is, of course, an error in transcript for "1237." Richard of Barking was Abbot of Westminster in 1222-46, and prompted Henry III. to build the Lady Chapel there.

D. M.

THE LATE FRANCIS CHAMBERS.

SIR,—The obituary notice of the late Mr. Francis Chambers, in your issue of the 15th inst., includes Paul's Wharf, Upper Thames-street, amongst the list of his works.

These premises have, however, been recently rebuilt for Messrs. Alex. Cowan & Sons, Limited, from our own designs, and it is East Paul's Wharf (No. 26, Upper Thames-street) which should have been ascribed to his firm.

STOCK, PAGE, & STOCK.

LOCAL BUILDING SOCIETIES.

SIR,—Do any of your readers know of any building societies of good standing who are prepared to open branches in country towns under a resident local secretary and with a local surveyor?

BUILDING ENQUIRER.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

21. LIGHTNING—THE ACTION OF LIGHTNING CONDUCTORS—THE PRINCIPLES OF THE LIGHTNING ARRESTERS USED IN TELEGRAPH, TELEPHONE, ARC LIGHTING, AND TRACTION WORK.

IF the inside and the outside of the base of a glass bottle be coated with tinfoil, we get what is called a Leyden jar. On connecting the two coatings to the terminals of a frictional machine, they receive equal and opposite charges of electricity. If now the end of a wire connected to one coating be brought near the end of a wire connected to the other coating, a spark takes place between the two, accompanied by a loud snapping noise. It is universally admitted that lightning is similar to this spark, but, of course, on an enormously larger scale. One of the coatings of the Leyden jar represents the earth, the other an electrified cloud. According to this theory, the difference of electric pressure between a cloud and the surface of the earth during a thunderstorm is measured by millions of volts. When this pressure gets above a certain amount the air gap between the two gets broken down, and a disruptive discharge takes place, diminishing the difference of pressure between the earth and the cloud. The lightning in its course follows the path of least resistance, and what this path is we have now to consider.

If the lightning flash be the same as the spark from a Leyden jar, then it is reasonable to assume that the phenomena which ensues when a Leyden jar is discharged will be likely to happen when a lightning flash strikes a lightning conductor. The following experiment illustrates what happens in the neighbourhood of a metal rod carrying a sudden discharge. Suppose we discharge a Leyden jar through a long thick wire whose other extremity is in contact with the outside coating of the jar. On presenting a knuckle near the rod a spark will often be got from it. If we have a coin fixed on a stick of sealing wax and hold it, insulated in this manner, near the wire a spark will take place between it and the wire when the discharge passes. Again, if we put a piece of thin wire near the thick wire then the discharge will spark from the thick wire to the thin wire and then back again to the thick wire, showing that the discharge prefers to travel by the thin wire for that portion of its journey.

If we only take into account the ohmic resistance of the wire, and neglect its inductance and capacity these phenomena are quite inexplicable. It was neglect of these considerations that led the Lightning Rod Conference of 1882 into several serious errors. For example, they state that "a man may with perfect impunity clasp a copper rod an inch in diameter, the bottom of which is well connected with moist earth, while the top of it receives a violent flash of lightning." Everyone who has received a shock from touching a thick copper rod carrying a Leyden jar discharge, can bear witness that to touch a lightning conductor during a thunderstorm would almost certainly be a fatal experiment. For electric discharges it is the inductance of the path that we have principally to consider and not its resistance. If we have a divided path, the resistance of one branch being millions of ohms and of the other only a minute fraction of an ohm, yet if the latter have the greater inductance, the lightning discharge will take place along the path of higher resistance. This is proved from some of the recommendations of the Lightning Rod Conference. Why, for example, do they insist that the lightning conductor must have no abrupt bends, unless it is because they recognised that the lightning discharge would not go round the corner, but would spark across from one point of the rod to another, so as to avoid going by the more inductive path?

It is owing to the inductance of a circuit that a current cannot be established in it instantaneously. This property of electricity is very similar to the inertia of matter. A finite velocity cannot be given to a body in an infinitely short time. If the barrel of a gun be full of snow it can easily be pushed out with a ramrod, but if we fire it out we run a risk of bursting the gun as the inertia of the snow makes it offer a tremendous resistance to any rapid change in its state. So the inductance of a circuit, although quite negligible when the current is slowly changing, yet offers enormous resistance to any rapid variation of the current. For example, in alternating current work a pressure of 10,000 volts may only produce a fraction of an ampere in the primary of a transformer although the ohmic resistance be only a few ohms.

It is known that the discharge of a Leyden jar is in many cases oscillatory and Lord Kelvin has shown theoretically why this should be the case. The question arises, is a lightning flash oscillatory? but, unfortunately, we have no direct observations on this point. The spokes of a wheel revolving a thousand times a second appear absolutely stationary when illumined by a lightning flash, but this merely proves that the flash is over or the flashes are over in less than the hundred-thousandth part of a second. Neither do the well-authenticated cases where a flash has apparently continued for a second or two prove that it was oscillatory, although it would certainly be easier to explain on this supposition.

Dr. Lodge has proved that there are two important classes of lightning flashes that take place in practice, and it is necessary to distinguish between them, as lightning rods which will protect from one class of flash may not be able to protect from the other class. In the first class of discharge the difference of pressure is gradually established between the cloud and the earth. In this case pointed conductors are very efficient protectors, and can protect conductors at greater altitudes than they are themselves. The stream of electrified air from the point seems to prepare the path of the discharge to itself. He has also shown that a column of heated gases like that proceeding from a kitchen chimney is a likely path for this kind of lightning flash if there be no pointed conductor near. In the second class of discharge the difference of electric pressure is established instantaneously. This case might arise if a flash of lightning took place between two clouds altering the pressure of one of them so much that it instantaneously discharged to earth. In this case he proved that points are not efficient protectors unless they were higher than every other part of the building. Dr. Lodge, of course, did not experiment with actual lightning rods and during actual thunderstorms. His experiments were with Leyden jar discharges and model lightning conductors. The differences between the two kinds of discharge, however, were so marked, and the phenomena observed were so similar to those recorded during actual thunderstorms that we are justified in adopting his conclusions.

Dr. Lodge's experiments prove that the function of a lightning-rod in actual practice is two-fold. It has either to conduct the charge to earth when struck or to prevent a lightning flash at all by the discharge from the points gradually equalising the pressure between the earth and the clouds. That this second action is appreciable is shown by the fact that the erection of a large number of lightning conductors in a neighbourhood diminishes the frequency of lightning flashes. In electrical storms, when the air is dry, such as sometimes happen in America, all pointed objects, such as lightning conductors, trees, &c., make an audible fizzling noise and have brushes of light on them. This shows that all points energetically try to equalise the pressure. When the lightning is accompanied by rain, then this action is negligible, and if a flash occur, it is probably an impulsive rush that will strike the highest object in the neighbourhood.

Some soils seem particularly liable to be struck by lightning flashes. Heavy damp soils, such as loam, are the most likely to be struck, whilst a dry chalky soil is rarely struck. In a recently-published United States bulletin the

relative frequency of strokes on different soils is given as follows:—1 in chalk, 2 in marl, 7 in clay, 9 in sand, and 22 in loam. A house built on a dry, chalky soil, therefore, has not the same need of protection as a house built on damper or heavier ground.

The most frequent fatalities in this country from lightning are to people standing under trees which are struck. In this case the lightning often "side flashes" from the tree to a person, the thickness of the tree offering more inductance to the discharge than the human body. Trees whose roots are near water are particularly liable to be struck. Again, a person in the centre of a field, or crossing the brow of a hill, might possibly be struck, as he would be the highest object in the neighbourhood. In America wire ropes are often used to hang clothes on to dry, and there are many fatalities every year to people taking the clothes off these wire ropes at the beginning of a thunderstorm.

There is not much danger of town houses being struck by lightning, as the gutters and rain-water pipes seem to afford them considerable protection. If, however, they are lofty or in specially exposed positions, then it is advisable to protect them with a lightning conductor. The lightning conductors used in this country are made of copper, but abroad and in America they are generally made of iron. Theoretically, there is not very much to choose between the two. It is stated in most books that the section of an iron rod ought to be eight times thicker than the section of a copper rod; but this is quite unnecessary. The statement was founded on the idea that an iron rod would offer eight times the resistance of a copper rod to an impulsive discharge. It can easily be proved experimentally that it offers practically the same resistance. Tape or stranded conductors are better than solid rods, as they have less inductance. In this climate iron, unless it be extremely well galvanised, does not last well.

The spear or top of a lightning conductor ought to terminate in four or five well-gilded or platinised points, and the lower end should make good and permanent earth by means of an earth-plate, which ought to be buried in a moist spot, and surrounded with a load of coke. The end is sometimes soldered to the water-pipes, which, of course, makes good earth through the water-mains. In one case the lightning conductor was earthed in an artificial pond full of gold-fish, with the result that when the first thunderstorm came all the fish were killed.

Important buildings are usually elaborately protected by means of lightning conductors. Yet even in this case there is a possible danger from side flash to neighbouring conductors, like gas pipes or stove pipes if they happen to run parallel to a lightning conductor. The Hôtel de Ville at Brussels, which is protected by a perfect network of wires, had a narrow escape from being burned down during a thunderstorm, as a spark from a lightning conductor to a piece of metal set fire to an escape of gas.

The question of whether we ought to connect all masses of metal such as lead roofs, rain-pipes, hot-water systems, &c., to the lightning conductors needs special consideration in each case. To connect a metal balcony to the lightning conductor is obviously inadmissible, as a person standing on the balcony would then be a lightning conductor. All vanes, finials, ridge ironwork, &c., on the roof ought to be connected to the conductor. Particular care also ought to be taken that there is a conductor near the kitchen chimney. It must be remembered, however, that the question has to be considered whether it be more advisable to ensure a building against damage from lightning at a trifling cost or to set up a system of lightning conductors which do not necessarily ensure absolute safety, and may possibly be a source of danger unless they are inspected every year.

Telegraph and telephone apparatus are peculiarly liable to be damaged by lightning. During a thunderstorm currents are induced in the overhead wires, which surge backwards and forwards, and the pressure driving them, being high, often sparks through the insulation of the coils of the instruments, creating a short circuit and ruining the instrument. The first lightning protector, or "arrester," as this class of apparatus is generally called, was the comb protector. We have two metal combs, with their points facing and very close to one another where the line joins the instrument. One of these combs is connected to the line, the other to the earth. In ordinary working nothing happens, as the metal combs, not touching one another, have practically an infinite resistance. When, however, electricity surges towards the instrument in a thunderstorm, then there is a divided path for the rush of current either to spark across the combs or to go round through the instrument, which has a high inductance. We have seen that in these circumstances the impulsive rush goes by the path of least inductance, and therefore sparks across the comb. Most other forms of arrester are made on the same principle. The Siemens' arrester, used by the General Post Office, consists of two metal plates separated by a washer of mica, giving a layer of air about one-thousandth of an inch thick. It has in addition a fuse so as to prevent the line being permanently earthed. In telephony Varley's form of arrester is often used. It has two sparking points *in vacuo*, but the principle of it is the same as the others, namely, that the electric rush will go by the path of least inductance.

When overhead wires are used for electric lighting special precautions have to be taken to prevent the electric surges set up during a thunderstorm from either piercing the insulation of the dynamo and so starting a short circuit that might burn out the machine, or sparking to earth, and the high pressure behind the spark maintaining an arc and so creating a dead-short circuit on the whole system. One of the earliest and most effective safety devices employed was the Thomson-Houston. In the Thomson-Houston system of arc lighting the arc lamps are arranged in series, and the pressure may be two or three thousand volts. Hence, if an arc were formed by a spark, the high pressure would maintain it, and there would be a risk of a breakdown of the whole system. The safety devices consist of two strips of copper close together at their lower ends and much farther apart at their upper ends. One of these is connected to the earth and the other to the line. If there is an impulsive rush, it will find its path of least resistance to earth by sparking across at the lowest point of the copper cheeks in the safety device. An arc will be formed at this point, but by means of a strong magnetic field produced by an electro-magnet it is blown upwards until its length is too great for the available pressure to maintain it, and consequently it goes out, leaving the line insulated from earth.

In order to protect the dynamos in the power-house of an overhead system of traction, numerous lightning arresters have to be fixed on the overhead trolley wire. Where thunderstorms are frequent sometimes as many as four arresters to the mile are fixed. The principle of the Ajax arrester is the same as the principle used in the devices we have described for protecting telegraph circuits. We have a path to earth of high resistance and low inductance. In this case two pieces of No. 26 silk insulated brass wire are twisted together, their ends being kept free so that there is no metallic connexion between the pieces of wire; one is connected to the trolley wire through a fuse, and the other is connected to the earth. The twisted portion is protected from the weather by means of a piece of glass tube. When an electric wave is set up in the wire it sparks across the silk insulation and gets to earth. The large current started to earth immediately blows the fuse, and so the trolley wire is insulated again. The melting of the fuse causes a carbon ball to drop, and so puts the next fuse, which is attached to pieces of brass wire, in exactly the same way as the first was, in circuit, and so the arrester is ready to act a second time. Ten or twelve fuses are generally arranged in each arrester.

In the Wurts lightning arrester for use on overhead trolley systems some further principles are utilised. It is known, for example, that a discharge passes more readily over a non-conducting surface like glass or wood than through an equal air gap, and that a pencil mark facilitates this discharge. It is also known that to maintain an arc there must be vapours of the electrodes present. If these vapours are prevented from forming, no arc can be maintained. In the Wurts arrester, two flat pieces of metal are mounted on a wooden block flush with the surface, and charred grooves in the wood connect their ends together. A second wooden block fits closely over the first, so that there is no room for metal vapours to form. One of the pieces of metal is connected to the trolley wire, and the other to the earth. This arrester is found effective in practice, but the resistance between its terminals is only about 50,000 ohms. With 500 volts pressure it will be seen that the leakage continually taking place is appreciable. In an older form of lightning arrester Wurts placed small zinc cylinders on a slab of marble separated from one another by a small air gap, as he found that it was almost impossible for an arc to be maintained between zinc electrodes. He also found three other metals—namely, cadmium, magnesium, and mercury—which he called non-arcing metals, owing to the difficulty of maintainin an arc with them.

In places where thunderstorms are very severe, then, during the progress of a thunderstorm, it is sometimes found necessary to make a large artificial leak on the line itself so as to protect the system thoroughly. In the Westinghouse tank arrester, for example, we have wooden tanks about 2 ft. square and 1 ft. in depth, through which water is constantly flowing. A carbon placed in the water and connected to the trolley wire makes an artificial leak to earth of about ten or twenty ampères, and protects the system. The energy expended in maintaining this leak is about ten horse-power, as the pressure is 500 volts. This, however, is a small price to pay for the safety of the system during a thunderstorm.

OBITUARY.

M. RÉVOIL.—The death is announced, at Marseilles, of Henri Antoine Révoil, at the age of seventy-eight. He was the senior among the Government Architects of France, and his death is a great loss to French architecture, for there is hardly an important town in Provence or Languedoc in which he has not built a church or chapel. He exhibited in the Salon in 1872 drawings of the chapel of St. Gabriel, near Tarascon, of the restoration of the Roman bridge at Chamas, and of the cloister at Frejus. In the great exhibition of 1867 he exhibited a fine series of drawings of the principal architectural monuments of the South of France. In that of 1878 he exhibited the drawings of the church of Bourg-St.-Audeol. He designed the tomb of Mgr. Casterigé at Nimes. He was author of a very interesting work on the Romanesque architecture of the South of France. Among the numerous modern buildings which he carried out, the cathedral of Marseilles is the most important and the best known. A view and description of this fine church, one of the best examples of what may be called the French neo-Byzantine type of architecture, was given in the *Builder* of June 1, 1889. M. Révoil, who was a pupil of Caristie, was created "Officier" of the Legion of Honour in 1878, and was subsequently promoted to the rank of "Commandeur" in recognition of his eminent services in the cause of art.

GENERAL BUILDING NEWS.

RESTORATION OF MORETON SAYE CHURCH, SHROPSHIRE.—This church has undergone restoration. The work has included the rebuilding of the eastern gable, and the substitution of a five-light Perpendicular window in the east wall, in place of the round headed one. A timber porch has been erected over the south doorway. A chancel has been formed in the church by the construction of a carved oak screen. A carved and panelled oak roof has been substituted for the plaster ceiling. The floors have been renewed, and an oak pulpit, choir stalls, and a lectern have been placed in the church. The east window was by Mr. C. E. Kempe, of London. Mr. Bridgman, of Lichfield, was the contractor, and Mr. C. Hodgson Fowler, of Durham, was the architect.

CHURCH, WESTON GREEN, THAMES DITTON, SURREY.—The foundation-stone was laid recently of All Saints' Church, Weston Park-road, Weston Green. At present it is intended to proceed only with the erection of the nave, which will be 56 ft. long and 21 ft. 8 in. wide. A chancel, 25 ft., and two transepts will be added. Accommodation will be provided for 140 worshippers at present, but it will be extended eventually to 220. The building will be of red and yellow bricks, with stone dressings. Mr. A. J. Style is the architect, and Messrs. Wheatley & Sons, of East Molesey, are the contractors.

ST. JOSEPH'S CATHOLIC CHURCH, LEYTON.—The new school-chapel of St. Joseph's, Vicarage-road, Leyton, has just been opened. The new building is of two stories, and the upper one has been fitted up as the temporary chapel until such time as the permanent structure, the site for which is in an adjacent part of Vicarage-road, is erected. The lower story will be used for an elementary school, as also will the other part when it ceases to be used as a chapel. The school will accommodate 352 scholars. The whole building has been erected at a cost of about 2,500*l*. Mr. Guy, of Leytonstone, was the builder, to plans prepared by Messrs. Sinnott & Powell, of Liverpool.

WESLEY CHAPEL, REDRUTH. — At a cost of nearly 2,000*l.*, Wesley Chapel, Redruth, has been considerably improved. All the old plain-glass windows have been replaced by coloured windows. The seats in the gallery have been modernised and made to correspond with those in the body of the chapel; the old organ has been sold to Messrs. Hele, of Plymouth, who are to supply practically a new one; the rostrum has been repolished; and the walls and ceiling recoloured and decorated. The work has been carried out under the direction of Mr. Horace Collins, architect, of Redruth.

ROMAN CATHOLIC CHAPEL, MOTHERWELL, EDINBURGH.—The new Roman Catholic Chapel, which has been erected by the congregation of the Church of "Our Lady of Good Aid," Motherwell, at a cost of between 11,000*l.* and 12,000*l.*, was opened on the 9th inst. The church, which has been erected in Coursington-street, and adjoining the old chapel, consists of nave, chancel, aisles, side chapels, baptistry, confessionals, and ample sacristy accommodation. The nave is divided into seven bays, and is separated from the aisles by an arcade which supports the clearstory. The chancel, which is divided from the nave by double principals, is apsidal in form. There is a chapel on either side at the chancel end of each aisle. The church is entered at the west end by two doors; there is another entrance in the north wall of aisle; and there is also an exit door at the chancel end of aisle. The west gable is pierced by a five-light window, which is 28 ft. high. In each bay of the clearstory there is a four-light window with traceried head. At the same height in the chancel is a three-light in each bay. The internal length of the church is 130 ft., and it is 62 ft. wide and 64 ft. high. The church will accommodate 1,000 people. Red stone has been used in its construction, and the building will be lighted with electricity. The whole has been designed by Messrs. Pugin & Pugin, architects, London.

BOARD SCHOOL, ST. GEORGE, BRISTOL.—The new Board school at Dean-lane, Moorfields, St. George, Bristol, was opened on the 5th inst. The school is in two blocks and will accommodate 900 children—300 boys, 300 girls, and 300 infants. Pennant stone and freestone dressings are the materials used. Mr. J. Mackay, of Kingswood, was the architect, and Messrs. A. J. Beaven & Co., of Bristol, were the contractors. Messrs. Skinner, Board, & Co., of Bristol, supplied the heating apparatus.

BOARD SCHOOL, RAWMARSH, YORKSHIRE.— The Board school which has been built in the district of Ryecroft, Rawmarsh, was opened on the 3rd inst. The new school adjoins the existing schools, and has a frontage to South-street. Accommodation for 200 children has been provided. The classrooms are divided by a movable partition, so that a large room can be provided when desired. There are separate entrances, cloakrooms, &c., for the boys and girls. The floors of the school are laid with pitch-pine interlocking blocks, and the walls have dadoes of brown-glazed brick. The exterior of the building is faced with Leicester-pressed bricks, with ashlar dressings. The cost has been about 2,600*l.* Mr. J. Platts, of Rawmarsh and Rotherham, was the architect, Mr. G. Pugh, of Rawmarsh, having been the contractor, with several sub-contractors. Messrs. Wright Bros., of Attercliffe, supplied the heating apparatus.

MUNICIPAL OFFICES, KEIGHLEY.—The new municipal offices, Keighley, have been erected by the Corporation in Bow-street. The building, which comprises four stories and basement, stands on the portion of the Town Hall site immediately adjoining the post office, on the North-street side. The plans for the new offices were formally passed by the Town Council on April 11, 1899, and the work of excavating for the foundations was begun about four months afterwards. The Council accepted Mr. John Haggas's design for the building, and the adopted plans for the interior of the premises were those of Messrs. J. B. Bailey & Son. The cost of the building will, it is expected, come within the 10,300*l.* for which the Council obtained borrowing powers. The various contracts have been executed as follows:—Masonry and iron and steel work, Mr. T. Moore; joiner, Mr. Ineson Taylor, Lees; slating, Messrs. T. Nelson & Sons, Bradford; plastering and concreting, Messrs. Bradley, Krischke, & Co., Bradford; plumbing, Mr. Jas. Jackson; heating, Messrs. Bailey & Clapham; painting, Messrs. Tillotson & Harrison; furniture and fittings, Messrs. Simpson & Sons, Limited, Halifax; electric fittings, Messrs. G. H. Woods & Co., Blackburn.

BUILDING IN ABERDEEN IN 1900.—During the year just closing the total of building operations carried on has been about 25 per cent. less than in 1899, and the lull is not likely to end for six months yet. Very few public buildings of any consequence have been completed, and house-building has been restricted mainly to the erection of suburban villas, although a good few business premises of moderate size have been erected during the twelvemonth. The wages both of masons and joiners have been reduced, and many operatives of these classes have left the town, where the number of unemployed is still considerable. It was lately officially announced by Mr. Akers-Douglas in the House of Commons that building operations at the new general post-office for Aberdeen could not be begun till after the middle of 1901. It has also been found that the erection of the new Greyfriars Church cannot be commenced till Whitsunday removal term (May 28) next. It has likewise been found necessary to issue fresh schedules for the proposed new asylum at Newmachar—Mr. A. Marshall Mackenzie, A.R.S.A., architect—near the city, which will delay the commencement of operations for a month at least, while it is not known when the new joint railway-station buildings are to be taken in hand. In the near future, however, the new poorhouse at Oldmill (Messrs. Brown & Watt, architects), for Aberdeen Parish Council, and a new electric station at Ferryhill, for Aberdeen Town Council, are to be contracted for. Numerous private buildings in the older parts of the city will also have to be reconstructed soon, and though the immediate prospect is not very bright, things will look far more hopeful in a few months. The plans of new buildings approved of by the Town Council of Aberdeen during the period from January to December of this year may be classified as follows:—Dwelling-houses, 228; blocks of dwelling-houses and shops, 6; additions and alterations at various premises, 60; shops, 12; factories, workshops, &c., 20; miscellaneous (warehouses, stores, stables, &c.), 38; public buildings, 26. Among public buildings are included additions at eight Board schools, a new R. C. school, and alterations at F. C. Training College, and St. Margaret's School; extension of Aberdeen Fish Market; new meat market, Hutcheon-street; alterations at Aberdeen Art Gallery; alterations at Nazareth Almshouse; additions and alterations, Borough Hall, Woodside mission hall, Correction Wynd, Y.M.C.A. Hall, Union-street, Free East Church, Belmont-street, Drill-hall, Woolman Hill, and Sick Children's Hospital, Castle-terrace; also new life assurance office, Union-terrace, and new church at Ruthriesston. Two large churches have also been finished and opened in the Beechgrove district.

EDINBURGH CITY CHAMBERS IMPROVEMENT AND EXTENSION.—The plans for a further instalment of the general scheme for the extension of the City Chambers were submitted and passed at the Edinburgh Dean of Guild Court on the 13th inst. The new building will extend to Cockburn-street at the north-west corner of the Chambers, and will occupy the ground upon which stood what was formerly known as the City Hotel. The basement will be heavily rusticated, and the two stories above will be in rusticated channelled ashlar. Then there will be a story in broken ashlar, and all above will be in plain ashlar. The building will terminate in the top story in an Ionic order the whole height of the Council Chamber. That will be treated with columns of the same order with entablature and pediment above, the centre part culminating in a group of statuary. The various sub-divisions of the elevation will be treated with appropriate moulded string courses. The most interesting part of the plans passed related to the new Council Chamber. The length of the chamber will be 65 ft., and its width 37 ft., and it will be divided longitudinally into three portions, the centre forming a square in the centre of its length. That by means of columns of the Ionic order will support an entablature of a like order, from which will spring a boldly-covered hemispherical dome of somewhat restricted rise. In the crown of the dome a foliated cupola about 10 ft. in diameter will admit light from the superimposed roof, and the light will be toned down by means of ornamental glazing. From the north end of the room an interrupted view will be obtained towards Princes-street, and over the Firth of Forth; and the south end, where there will be a gallery, will be reserved as a space for the general public. It is understood that the chamber will be used on special State occasions as a banqueting hall, and with that object in view there will be provided a servery and other appurtenances in direct communication with the kitchen. In the centre of the chamber on the west side will be a fireplace with pilaster, entablature, and overmantel designed in keeping with the general character of the apartment. The walnut panelling of the room will be richly treated and the entrance doorways will be panelled with pilaster, trusses, and carved pediments. The chamber will be on the same level as the present meeting place of the Town Councillors. Below the Council Chamber there will be a flat devoted to the officials of the Burgh Court, and on the level of the piazza there will be a room for the meetings of the members of the Dean of Guild Court. On the basement will be a laundry for the use of the building, and behind that to the south a large boiler-house, which will provide the power for heating, ventilating, and other purposes. Access will also be got in connexion with this block to a coal store from which there will be a lift for delivering coals to every part of the building. The intermediate flat over the basement will be occupied as a dwelling-house for the porter. The roof will be constructed of steel, and the building will be rendered fire-resisting throughout. From the street to the ridge of the roof the height of the building will be about 130 ft. The contract for the mason work has been let to Messrs. Turner & Sons, and for the joiner work to Mr. Colin Macandrew. It has been agreed to recommend the acceptance of an estimate, amounting to slightly more than 3,000*l.*, for the rebuilding of the front screen of the City Chambers, the original of which was recently pulled down in connexion with the municipal buildings improvement scheme. The plans for the new arcading show a screen of simple character, and in keeping with the general style of the original arches, but differing in this respect, that the masonry is only half the depth of the old structure. The screen consists of seven arches of stone vaulting—the second arches from the ends respectively being somewhat wider than the others and forming an entrance and an exit for carriages passing into and from the square.—*Scotsman.*

BANK BUILDINGS, TUNSTALL.—The Manchester, Liverpool, and District Bank's new premises, which have been in course of erection opposite the Town Hall, Tunstall, for some considerable time, have just been taken possession of and opened. They occupy a corner site, which has been taken advantage of in the design by having a corner doorway worked up into an angle tower and turret. To the height of the first floor the building is faced with Hollington stone, and above to the roof with buff terra-cotta supplied from Tamworth (Gibbs & Canning). In the interior the walls are lined 12 ft. high with teak panelling; the floors are oak blocks; and the space for the public has a mosaic tile floor. There are strong-rooms, book-stores, lavatories, &c. The upper floors are devoted to the purposes of a manager's house. The general work has been executed by Mr. W. Cooke, builder, Burslem. Messrs. Edwards, of Newcastle, are responsible for the fittings. The whole of the work has been carried out under the direction of and from the designs of Messrs. Wood & Hutchings, architects, of Tunstall and Burslem.

LAUNDRY PREMISES, SHEFFIELD.—A block of buildings has been erected at Sheffield, near to Coniston-road, for purposes of a steam-laundry. The machinery has been supplied by Messrs. Bell, of Bradford. Messrs. Hawksley, Wild, & Co. supplied the boiler. The buildings were erected by Mr. Hancock, of Sheffield, from designs by Mr. W. J. Taylor, of the same town.

THE RYDAL MOUNT SCHOOL, COLWYN BAY.—The new dining-hall of Rydal Mount School, Colwyn Bay, which was formally opened on the 14th inst., has been erected from the designs and under the superintendence of the architect to the school, Mr. T. E. Lidiard James, of London. It follows generally the lines of the old public school halls, the relative positions of the high table, buffets, screens, minstrels' gallery, &c., being retained as far as modern and local requirements allow. The hall, throughout is oak panelled; the screens, gallery, &c., are also in oak; the windows are filled with specially designed lead glazing, a portion of the lights to recessed bays being enriched with heraldic glazing arranged in a chronological sequence. It forms a portion of a scheme, and occupies a middle position between the older portions of the school and the newer parts. When the additional house block is completed, the hall will be the centre feature in the school quadrangle facing the Pwllycrochan-avenue. It is 66 ft. long by 27 ft. wide, the height to the wall-plates being 17 ft. and to the collar 25 ft., and its acoustic properties are excellent. The contract for both hall and additional house is being carried out by Messrs. J. Gethin & Co., of Shrewsbury; the clerk of works being Mr. R. H. Henley.

BUSINESS PREMISES, LEITH.—New offices and bonded stores have been erected at the corner of Coburg and Couper-street, Leith, by Messrs. A. Alexander & Co. The buildings are six stories in height, and were designed by Mr. W. N. Thomson, of Leith.

BUILDING SCHEME, BLACKBURN.—The Blackburn Exchange Hall, with the Exchange Hotel and other property, is to be pulled down, and shops, arcades, &c., are to be erected on the site. Plans have been prepared by Messrs. Briggs & Wolstenholme, of Blackburn.

WORKING LADS' INSTITUTE, WHITECHAPEL.—On Monday evening the 10th inst., this building was re-opened after extensive alterations. It was erected originally from the designs of Mr. George Baines about fifteen years ago in sections, the last portion being a spacious lecture-hall, with swimming bath under. This portion of the property was recently compulsorily acquired by the Whitechapel and Bow Railway Company, and has been pulled down. The remainder of the premises has been remodelled for the purposes of the institute, the old reading-room on the first floor being enlarged by the addition of another room, the two together now forming a large lecture-room, the reading-room being transferred to the floor above. New caretaker's-rooms have been added in the rear, and a new retiring-room to the lecture-room, and the whole premises have been decorated. The work has been carried out under the superintendence of Messrs. George & R. P. Baines, architects, by Messrs. Turtle & Appleton, at a cost of about 1,300*l.*, inclusive of electric lighting throughout.

NEW WORKHOUSE, DONCASTER. — On the 4th inst. the new workhouse at Balby, near Doncaster, erected by the Doncaster Board of Guardians, was formally opened. The buildings, which have cost about 100,000*l.*, are situated near Balby. The site comprises about 30 acres, which provides ample space for future extension, the accommodation of the new buildings being for 600. The buildings

consist of six groups, viz.:—Entrance building, main building, laundry and boiler-house building, infirmary, lunacy building, and isolation hospital. The entrance building, through the archway of which is the principal approach to the buildings, contains porter's accommodation, receiving wards, and vagrant wards (vagrants of both sexes are provided for, principally on the cellular system). In this building are also rooms in which to store the clothing of the inmates when taken from them on leaving the receiving wards for their respective places in the workhouse. The workhouse proper, or main building, is in the centre, in the front of which are the committee-room, business offices, and master's house, and in the rear of these the dining-hall, kitchen lighted from the roof, scullery, work-rooms, matron's office and stores, bakery, and flour store. Upon each side of the administrative block, and connected by corridors, are the pavilions for the male and female, aged and able-bodied classes, with the necessary dayrooms, officers' rooms, bathrooms, lavatories, and offices. The laundry and boiler-house buildings are placed in a central position between the main building, lunacy blocks, and infirmary. The boiler-house has space for three boilers, and in close proximity to it is the electric light house, with dynamo and accumulator-rooms, the workshops, coal-house, and water tower. The infirmary is in the south-west portion of the site, and is a complete building in itself, and consists of a central building, from which corridors to the left and right lead to the male and female pavilions, which pavilions are divided up into wards for the various class of sick. The nurses' homes occupy the central building, and contain nurses' bedrooms, sitting, recreation-rooms, &c., doctor's surgery, and dispensary. The front of the infirmary wards face the south. All the walls of the wards are of hard, impervious plaster, with glazed brick dadoes of light colour; the lavatories, &c., are lined with glazed bricks. The heating of the large infirmary wards is by hot water and by means of central stoves faced with faïence, with horizontal flues in the thickness of the floors, which are supplied with fresh air direct from the outside. The maternity block is in the rear of the infirmary. The lunacy buildings occupy a similar position to the infirmary, but in the south-east portion of the site, and provide accommodation for imbeciles, epileptics, and short period lunatics. The buildings contain wards for the different classes, and padded and attendants' rooms for both sexes. The isolation hospital is a complete building in itself, and has its own nurses' accommodation, washhouse, and mortuary. It is situated in a remote position to the north of the main building. The aged married couples' cottages are on the south side of the main building, and are entirely separate from it. Each of the cottages will have pleasant gardens, with a light metal palisading fronting them. The buildings are faced with bricks and stone dressings, with slated roofs. The corridors and wards in the main buildings have dadoes of salt-glazed bricks, whilst the kitchens and sanitary offices are of cream glazed bricks. The lighting throughout is by electricity. The contractors for the whole of the work have been Messrs. Harold Arnold & Son, of Doncaster, the architect being Mr. J. H. Morton, F.R.I.B.A., of South Shields. The principal sub-contractors have been Messrs. Benham & Sons, Limited, of London, for the principal portion of the engineering; the Keighley Electrical Engineering Company, Limited, for the electric lighting; and Messrs. Dinning & Cooke, of Newcastle-on-Tyne, the heating. Mr. R. M. Robertson has acted as clerk of works.

PRIMITIVE METHODIST CHURCH, SUNDERLAND.—On the 5th inst. the Sunday school building, which, together with a church, has been in course of erection in Cleveland-road, Sunderland, was opened. The church is not yet finished. The school will accommodate over 360 persons, and when completed the church will seat over 460. Messrs. W. & T. R. Milburn are the architects, Mr. John Elrick being the contractor. The total cost will be over 4,000*l.*

HOUSING OF THE WORKING CLASSES, MERTHYR.—Mr. W. O. E. Meade King, an Inspector to the Local Government Board, held an inquiry at the Town Hall, Merthyr, on the 5th inst. into an application by the Urban District Council for sanction to borrow 15,000*l.* for the provision of dwellings for the workingclasses. Mr. T. F. Harvey, the Surveyor to the Council, showed plans of 100 cottages proposed to be erected at Penydarren, on a site which, it was stated, could be obtained on a 999 years' lease at a ground rent of 1½d. per square yard. The houses would occupy four new streets and the cost would be 150*l.* per house. It was explained that this was only part of the scheme; the whole scheme was for 500 houses in various parts of the district. The scheme has met with some opposition.

A NEW THEATRE IN SHAFTESBURY-AVENUE.—A site has been taken for a new theatre, to be called the Apollo Theatre, adjoining the Lyric Theatre, by Mr. Lowenfeld, for whom the plans and designs will be made by Mr. L. Sharp.

THE WOOL EXCHANGE, COLEMAN-STREET.—Mr. Francis Witt has prepared designs for a considerable extension of the building in Coleman-street, as an enlargement of the restaurant in the front portion of the basement and ground floors.

SANITARY AND ENGINEERING NEWS.

HEYWOOD SEWAGE SCHEMES.—A special meeting of the Health Committee of the Heywood Corporation was held on the 10th inst., when a scheme for the purification of Heap Bridge district was submitted by Mr. James Diggle, C.E. The scheme was approved, and it was decided to recommend the Town Council to apply to the Local Government Board for borrowing powers for 25,100*l.*, 8,600*l.* being for the Heap Bridge sewage scheme, and 16,500*l.* on account of the sewage scheme at Botany.

THE DRAINAGE OF HOVE.—A Local Government Board inquiry into an application by the Hove Town Council for sanction to borrow 6,000*l.* for works of sewerage was held by Colonel A. G. Durnford, R.E., at the Hove Town Hall, on the 12th inst. It was explained that the money was required for the construction of new sewers from the south end of Goldstone-street, eastward to the intercepting sewer at the bottom of Medina-villas, also for enlarging the small portion of sewer in Sackville-street between Blatchington-road and Portland-road from 2 ft. to 3 ft. in diameter. The scheme was explained by Mr. H. H. Scott, the Borough Surveyor.

SEWERAGE SCHEME, BIRSTALL, LEICESTERSHIRE.—On the 13th inst. Lieutenant-Colonel A. C. Smith, R.E., an Inspector to the Local Government Board, held an inquiry at the National School, Birstall, into an application by the Barrow-on-Soar Rural District Council for permission to borrow 8,250*l.* for purposes of sewerage and sewage disposal for Birstall. The scheme was explained by Mr. Simpson, the engineer.

SEWAGE PURIFICATION SCHEMES, DUMFRIES AND MAXWELLTOWN.—Mr. W. Carter, C.E., Edinburgh, has reported to the Town Councils of Dumfries and Maxwelltown as to the purification of sewage before it is discharged into the river Nith. He recommends a separate scheme for each burgh. The scheme for Dumfries he roughly estimates, would cost 30,000*l.*, and the scheme for Maxwelltown is estimated to cost 14,000*l.*

FOREIGN.

FRANCE.—The six first galleries of the Musée des Arts Decoratifs are in course of arrangement in the Pavillon Marsan, and will be devoted to ancient furniture and other objects of art. They will be opened early in January.——It is announced that, on the proposal of M. Bouvard, the crypt of the Khmer temple, which was in the Colonial Exhibition at the Trocadéro, is to be permanently preserved.——The commemorative medal of the recent Paris Exhibition, designed by M. Roty, is being struck at the Hôtel des Monnaies. On the obverse of the medal the artist has represented the personified figure of the Exhibition handing the torch of progress to Posterity. On the reverse is a garland of roses and laurels, surmounted by a perspective view of the Avenue Nicolas II.——It is proposed to rebuild the Luxembourg Museum with a façade towards the Rue Auguste Comte, opposite the small college of Louis le Grand, behind the Luxembourg. M. Scellier de Gisors will probably be appointed architect, and it is proposed that the façade should be of a very simple character, specially designed to secure good lighting for pictures, a point too much neglected by the architects of the other portions of the building.——The exhibition of the Société des Artistes Français (Old Salon) will be held next year in the new Grand Palais at the Champs Elysées, from May 1 to June 30—a longer period than usual. It is proposed to admit 1,500 pictures, and 500 drawings, in addition to the sculpture. The examination of architectural drawings sent for exhibition will take place on April 3 and 4. No artist will be allowed to exhibit more than two works.——One hundred and fourteen artists have taken part in the competition opened by the Conseil Général of the Seine for the artistic decoration of the Mairie of Asnières; the decoration to consist of a landscape painting.——M. Fernoux has been elected President of the Société Nationale des Architectes de France, for the ensuing year.——M. Ferdinand Fuchs, architect, of Besançon, has died, at the age of thirty-four. He was a pupil of M. Daumet and M. Girault, and one therefore from whom good work might have been expected had he lived.

INDIA.—The North-Western Railway Company is constructing platforms and sidings for the British and native general hospital at Quetta.——An official publication states that the total area of land irrigated in India during 1898-99 was 18½ million acres.——The foundation stone of considerable additions to the civil hospital at Karachi was recently laid by the Viceroy. The total cost of the new work is estimated at 63,000 rupees.——In view of the unsatisfactory condition of the water main from Lake Vehar to Tansa, supplying part of the city of Bombay, the Corporation have sanctioned as a preliminary measure the replacement of 1½ miles of old pipes by 48-in. steel pipes. Five miles will, in all, have to be ultimately replaced.

MISCELLANEOUS.

BELGIAN CEMENT AND MACADAM.—One of the most prosperous of Ghent industries is the manufacture of cement, cement stones, and similar objects, and the export trade to the British Isles has of late years taken considerable extension. Total exports, which for 1897 were registered at 14,040 tons, increased in 1898 to 21,076 tons, and (as appears from the latest official statistics) in 1899 to 26,067 tons. Although in these totals are included the consignments from the interior of the country, notably from Tournai, the bulk is made up of shipments from Ghent works. Great effort is made to maintain the reputation of the article for quality, and the price at which it can be offered, by reason of cheap labour, secures a ready market in the British Isles and in the colonies. Macadam, which is carried at very low freights, varies in the quantity exported, according as there may be spare room in vessels to receive it. Under these circumstances, it is pointed out, the difference of 5,849 tons more in 1899 than in 1898 assumes no special importance, and the total of neither year equals that of 1897, which was 43,433 tons.

URBAN DISTRICT COUNCIL OF HANDSWORTH.—At the ordinary meeting of the Urban District Council, held on December 12, it was resolved to accept Mr. George Trentham's tender of 1,848*l.* for the making-up of Hutton-road. Fifteen plans, representing fifty-three houses and shops, three alterations and additions, and six new streets, to be called "Avenue-road," "Beverley-road," "Deans-court-road," "Farnham-road," "Green Hill-road," and "Uplands-road," were approved.

THE VALUE OF STRAND PROPERTY.—Mr. John Troutbeck, High Bailiff for Westminster, and a special jury sat on the 17th inst. for the purpose of assessing the compensation to be paid by the London County Council to the Aërated Bread Company, Limited, for the compulsory acquisition of the lease of their depot, 263, Strand, at the corner of Clement's Inn and immediately adjacent to the Law Courts, the site being required for the Strand improvement. Mr. Littler, Q.C., for the claimants, said this shop was started in 1887, and the lease had six and a half years to run. The rent was 500*l.* per annum for the ground floor and basement, but his evidence would show that the place was worth at least 900*l.* a year, the profit rental being, therefore, 400*l.* The value of the fittings had been agreed at 475*l.* The trade had been steadily progressing. During 1896-7 the net profits were 1,059*l.*, 1897-8 1,137*l.*, and 1898-9 1,321*l.* That was an average of 1,172*l.* per annum. He asked the jury for three and a half years' purchase, making the total sum claimed 6,037*l.* Evidence for the claimants was given by Mr. Douglas Young, a surveyor, Mr. Edward Bousfield, and Mr. Daniel Watney, all of whom agreed that the premises were well worth 900*l.* a year, and the last-named said he considered the property had increased 100 per cent. in value since 1887. Sir Edward Clarke, who represented the London County Council, characterised the claim as an extravagant one, but admitted that the property had increased in value to some extent. Mr. Edmund Farmer, of Cheapside, said he considered 650*l.* a year the full value of the property, and, allowing 99*l.* for profit rent, and two years' purchase of the profits, a sum of 3,509*l.* would amply compensate the company. Mr. James Green, of Chancery-lane, also put the profit rental at 160*l.*, but would give the company only one and a half year's purchase of their profits. He did not deny that the profits might have gone on increasing for another six and a half years, but it was speculation. The jury awarded the claimants 4,225*l.*

THE SANITARY INSTITUTE.—At an examination in practical sanitary science, held in Manchester on December 14 and 15, 1900, four candidates presented themselves, and the following two candidates were awarded certificates:—J. S. Andrew and James G. D. Armstrong.

CAPITAL AND LABOUR.

EMPLOYMENT IN THE BUILDING TRADES DURING NOVEMBER.—The December issue of the *Labour Gazette* reports that during November employment in the building trades fell off to some extent. The percentage of unemployed union members among carpenters and plumbers at the end of November was 3·3, compared with 2·5 in October and 1·5 in November, 1899. The London report states also that the building trades are not so well employed. Returns from 187 branches of eight unions paying unemployed benefit, with a membership of 13,801, show that 517 (or 3·7 per cent.) were unemployed, compared with 2·8 per cent. in October, and 0·7 per cent. in November, 1899. The stonecarvers describe employment as "fair"; the plumbers as "moderate"; the stonemasons, bricklayers, carpenters and joiners, and painters and decorators as "dull"; and the plasterers as "bad." Six disputes commenced during the month, the number of workpeople affected being 831. Four of the disputes were in England and two in Ireland. The dispute in the Northern counties has affected 450 bricklayers. At Rochdale some plumbers refused to work with non-unionists, and fifty have come out. At Birmingham some joiners objected to the employ-

ment of cabinet-makers on work alleged to belong to joiners, but an amicable settlement has been arrived at. The employment of labourers as wallers led to a strike of masons at Bakewell, but the cause of complaint has been removed. Of the two disputes in Ireland one was in Dublin, where 260 plumbers have come out on strike for an advance in wages of 1d. per hour; and the other was at Cork, and affected nine plumbers, the cause being the alleged deduction from outworking allowance. The outworking allowance has been maintained.

DUNDEE BUILDING TRADE.—About a month ago the master masons of Dundee gave notice to the operatives in their employment of a reduction of 1d. an hour in the wages, the new arrangement to come into effect on February 15. At a meeting of the men on the 10th inst. the employers' communication came up again for discussion. A motion was brought forward that a reply be sent to the employers stating that they do not see their way to agree to the decrease. It was moved as an amendment that the meeting ignore the masters' notice altogether, and on a vote the amendment was carried by a large majority. It was further decided to appeal to fellow tradesmen throughout the country for funds to enable them to resist the action of the employers.

LEGAL.

BAD MORTAR.

AT Stratford Police-court recently, Mr. Charles White, builder, of Leyton, was summoned by the Leyton District Council in respect to some buildings at Sidney-road, Leyton, the walls of which, it was alleged, were "not properly bonded and solidly put together, in good mortar, compounded of good lime and clean, sharp sand or other suitable material." Mr. R. Vincent prosecuted; Mr. F. George defended. Mr. Martin, the building inspector, produced some of the mortar used, which he said was mainly composed of clay and mud, the sand used being very dirty. Mr. George entered a plea of "Guilty." He said that different mortars were used for different jobs, and one of the labourers by mistake used the inferior stuff. As soon as Mr. White heard of it he had the wall pulled down and rebuilt with proper material. The Bench imposed the full penalty of 5*l.*, with 7s. 6d. costs.

CROW *v.* THE BOARD OF WORKS FOR THE DISTRICT OF WHITECHAPEL.

INSPECTION CHAMBERS UNDER PUBLIC FOOTWAYS.

ON the 19th inst. the case of Crow *v.* the Board of Works for the District of Whitechapel came before a Divisional Court of Queen's Bench, consisting of Justices Kennedy and Darling, on the appeal of the defendants from a decision of Mr. Dickinson, the magistrate, sitting at the Thames Police-court in June last (reported in the *Builder* of June 9, 1900). The case came before the court in the form of a special case stated by the magistrate, from which it appeared that a summons was taken out by the District Surveyor against the Whitechapel Board of Works, for not having given him notice under Section 145 of the London Building Act, 1894, before they began certain works, viz., the construction of a number of boxes or inspection chambers under the streets in the district for the purpose of electric lighting. The general size of these chambers was approximately 10 ft. long by 5 ft. wide inclusive of the brick sides of the structure, and about 2 ft. 6 in. in depth. In some cases the chambers were octagonal in shape, 7 ft. 6 in. in diameter, and 7 ft. in depth. The chambers were constructed with a brick floor and sides 9 in. in thickness, upon which rests the steel joists carrying the manhole covers and paving-stones. The defendants were the Local Authority within the meaning of the Electric Lighting Acts, 1882 and 1888, for the district, and in the year 1892 were granted by the Board of Trade, pursuant to the Electric Lighting Acts of 1882 and 1888, in respect of such district, a provisional order called the Whitechapel District Electric Lighting Order, 1892, which was afterwards confirmed and came into force on June 27, 1892. By Sections 11 and 12 of this order the "undertakers" were authorised to construct in any street any such boxes as might be necessary for purposes in connexion with the supply of electric energy, including apparatus for the proper ventilation of such boxes. The sections further provided that "every such box shall be for the exclusive use of the undertakers and under their sole control, except so far as the Board of Trade may otherwise order, and shall be used by the undertakers only for the purpose of leading off service lines and other distributing conductors, or for examining, testing, regulating, measuring, directing, or controlling the supply of energy, or for examining or testing the conditions of the mains or other portions of the works or for other like purposes connected with the undertaking, and the undertakers may place therein meters, switches, and other suitable and proper apparatus for any of the above purposes. Every such box, including the upper surface or covering thereof shall be constructed of such materials and shall be constructed and maintained by the undertakers in such manner as not to be a source of danger whether by reason of inequality of surface or otherwise." Section 12 further provided that the undertakers should, one month before the commencement of such works, serve a notice upon the Postmaster-General describing the proposed works together with a plan of the proposed works and, in addition, a like notice and plan upon the County Council. The defendants did not before commencing the construction of the boxes in question serve Mr. Crow, as the District Surveyor, with notice of the intended work under Section 145 of the London Building Act, 1894. Mr. Crow's contention was that the boxes came within the definition of "building structure or work" in Section 145, and that the defendants were bound before commencing the work to serve upon him as the District Surveyor a "building notice" as prescribed by the Section. The defendants contended that the Act of 1894 did not apply at all to boxes constructed in streets under the provisional order, inasmuch as the order contained a complete code regulating the materials, situation, and mode of construction of such boxes, and provided a complete machinery for enforcing such regulations, and with which special code and machinery the London Building Act of 1894 was inconsistent. Mr. Dickinson, the magistrate, found as a fact that the boxes so constructed were "buildings, structures, or works" within the meaning of Section 145 of the London Building Act of 1894, and having regard to Sections 72, 201, and 203 of the said Act, he held that the provisions of Section 145 were not inconsistent with the special Act and fined the defendants the nominal sum of 1s. and ordered them to pay 10*l.* 10s. costs. From this decision the defendants now appealed.

Mr. H. F. Dickens, Q.C., and Mr. Talbot appeared for the appellants (defendants); and Mr. Horace Avory for the respondent (Mr. Crow).

At the conclusion of the arguments their Lordships reserved judgment.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

16,732.—A PRESERVATIVE FOR WOOD: *Berliner Holzcomptoir.*—An emulsion is made by dissolving tar-oil in a solution of soap and then stirring the tar-oil solution with water. For the impregnating compound it is claimed that a much smaller quantity of tar-oil than is customary needs to be employed.

16,747.—PNEUMATICAL MECHANISM FOR LIFTS: *F. G. Gracey and A. A. Gfeller.*—The mechanism is intended for use in regulating the fall of a lift-cage or platform or of a carriage, &c., upon an inclined railway, and so on. In one form two cylinders having separate air inlet and outlet valves are fixed underneath the platform or staging, their pistons being moved by means of crank discs, whose shaft is driven by a pinion that gears with a rack upon one of the guides, the outlet valves become shut with the platform's descent, the air finding escape through a hand-controlled valve; on this wise one can control the maximum rate of descent, whilst the breaking of the lifting-rope or other small damage is obviated. For the automatical opening and shutting of the valves the inventors join the valve spindles together by means of a rocking-frame that comprises a pair of rod-coupled bell-cranks, and other rods joined thereto act in unison with a cam upon the shaft so as to open and close the valves at the ascent and descent respectively; the rack is caused to stop short in order that a block may open the valves as soon as the platform has arrived at the bottom of the well.

16,779.—EXTINCTION OF FIRE: *G. Mills.*—To provide a support for an automatical sprinkler valve is contrived a T-shaped lever, which is sustained by a U-shaped lever in such a manner that the leg of the T rests within the bend of the U, thus constituting a compound lever whose parts a spring retains in their places; a socket soldered upon a tube secures the spring's end, a cooling of the joint being prevented by the use of insulating washers; a pointed screwed pin carries the compound lever upon its underside, and so serves for adjustment of the valve's pressure upon its seating. When the heat of the fire has melted the soldered joint, the compound lever will collapse, and the spring drives off the socket.

16,781.—COLOURING MATTER FOR STONEWARE, GLASS, PORCELAIN, AND SIMILAR GOODS: *R. Zsigmondy.*—For purple, vermilion, and rose lustre colours the inventor prepares solutions of 1 part by weight of gold mixed with from 0·2 to 5 parts by weight of silicic acid in the shape of an organical silicide, the silicide solution being made from an admixture of an alcohol, an essential oil, or a solution of resin, or a mixture thereof with chloride of silicon with evaporation of the chlorine; the addition of resinates, or original compounds of silver, lead, strontium, bismuth, zirconium, &c., will tend to vary the tints or colours; and for fixing the silvery lustre colours, the goods should be heated at a comparatively low temperature within a closed muffle.

16,789.—JOINTS FOR PIPES: *F. G. Pawsey.*—The joint, which is after the spigot-and-socket kind and is intended for drain, stank, rain-water, soil, ventilating and similar pipes, has upon its socket end an inner flange which constitutes a recess into which the stopping can be put and into which the spigot end is to be inserted; the flange should have a bevelled upper edge and be a little shorter than the socket.

16,800.—JOINTS FOR PIPES: *F. Stewart.*—A spigot-and-socket joint for pipes similar to those cited above consists of a strengthening tube made of copper or other metal, which is coated with lead and is fashioned with lugs or tacks. Other lugs are fitted upon a socket, which is put into a mould containing molten lead, the other lead-coated socket is adjusted with the next lying pipe ends. An expansion joint may be provided by fashioning a neck moulding at one end, or at both ends, of the socket.

16,809.—AN INSTRUMENT FOR THE TRACING OF CURVES: *W. Haedicke.*—The contrivance embraces two legs pivoted together and moving, above the hinge, upon a sector to which they may be clamped at any angle; at the upper and free end of each leg or rod is a shoe in which is cut a slot for retaining one end of a flexible strip which can be clamped in the slot and secured therein with a set-screw; the opening of the rods and a shortening of strip produce a flatter curve.

16,822.—FIRE-PROOF FLOORING: *G. Liebau.*—In the sides of hollow blocks are grooves which take metal rods that may have a T or some other suitable cross section; the floor is to be laid upon wooden supports having mortar joints; the blocks may either be built into the wall or extend over it. The metal rods when carried through the walls and provided with washers and nuts will answer the purpose of tie-rods.

16,827.—ASPHALT COMPOSITIONS: *N. D. Blake.*—A compound for paving, roofing, and flooring purposes, and for damp courses, &c., is made up of natural mineral bitumen, fine sand or limestone powder, and a mineral rock asphalt; when needed for paving purposes it may be cast into blocks with grooves for a filling of some bituminous cement, or it should be heated to a semi-plastic condition, spread over a foundation of concrete, and then raked and rolled. By another method the composition is made up with a larger amount of natural bitumen in order that it may be used in a liquid form.

16,856.—A STAY FOR CASEMENT WINDOWS: *T. Sampson and A. H. Attwater.*—The stay, which is notched along its under surface and is passed through a swivelling block carried by the fixed frame, is pivoted at its end to a bracket mounted upon the frame of the window; the opening of the window is prevented by means of a sliding piece that a spring forces upwards into engagement with the serrated notches cut in the stay, but when it is required to open the window one presses the slide downwards with a key for which a hole is made; in a modified form of the contrivance the key is to be inserted into a recess formed in the sliding-piece, the notches being, in that case, cut upon the stay's upper surface.

16,857.—A BRAKE-MECHANISM FOR USE WITH HOISTS, CRABS, PULLEY-BLOCKS, &C.: *C. Willetts and A. H. Rotham.*—Upon the pulley-block's frame is a spring pawl that will engage with a ratchet-wheel mounted upon the shaft of the worm, a screw having an opposite hand from that of the worm is engaged by a cone which a spiral spring joins to the shaft, a corresponding recess cut in the hub of the ratchet-wheel receives the cone. Whilst the load is being lifted the ratchet-wheel, cone, and shaft turn together, but when it is lowered the cone turns, through friction, within the wheel's hub, whilst the ratchet-wheel itself remains locked. The end thrust-plates are made of steel.

16,921.—KEY-HOLE SAWS: *F. E. Fitchew.*—The key-hole saw's blade is curved and has its back bevelled, the teeth are set towards the handle so that, for sawing, the workman draws the tool towards himself, the blade is secured within a socket upon the handle with two screws whereof one serves for a pinching-screw.

16,939.—CONSTRUCTION OF CEILINGS: *P. Esch.*—Into the sides of and from underneath the beams are nailed rabbetted blocks—which are, moreover, recessed and perforated—composed of pumice stone, gypsum, or some similar material, and then gypsum plaster is used for finishing the ceiling, sand or some other non-combustible substance being filled into the intervals between and above the beams. Care is taken that the recesses formed in the blocks are wide enough for taking the head of the hammer that is employed for knocking in the nails.

16,956.—CONDUITS FOR ELECTRICAL CONDUCTORS: *F. F. Bate.*—The conduits, which are made of concrete or other suitable materials, are fashioned with an oval section, the socket flanges being flattened both at top and bottom and bridge-pieces being fitted within them.

16,965.—FLOOR-BOARDS: *F. Gude.*—Dovetail blocks are laid so as to slide between strips and fillets that are nailed on to the joists, and the boards are screwed to the blocks. The boards are secured in position by the tightening of the screws, and can, moreover, be shifted to one side for a closing of the joints, springs being placed at the ends of the joists for automatically pressing the boards together, the spaces between the skirting boards—which are secured to the walls—and the floor should be filled with luting or wax.

16,992.—AN APPLIANCE FOR BAND-SAWS: *A. Arnold.*—By this appliance the bearings of the driving-spindles can be adjusted. Around an opening in the framing the inventor places plates, and there are screws (having hexagonal parts) that are to be turned within sockets in the bearing and pressed against the plates.

17,049.—AN APPLIANCE FOR USE IN VENTILATING DRAINS: *E. R. Palmer.*—For driving an exhaust fan water is impelled against blades mounted upon a shaft within the casing, down draught being prevented with a baffle-ring, and the shaft's middle portion being divided with a vertical partition; the central inoperative portion of the fan is stopped up with a disc.

17,080.—APPLIANCES FOR COOKING-STOVES: *J. Harper & Co. and C. Retallack.*—For oil stoves some heat-radiating plates are fastened to the top with curved projections which will engage with the two short cross-bars of the slots at the stove's top; the plates will serve for various purposes, as, *e.g.*, for the heating of irons or as side extension plates. In a varied form the stove's sides are hinged together, so that they may be closed, either obliquely or vertically, or be opened outwards horizontally, a loose top being fitted upon them when closed. The invention is described as being applicable to gas and other stoves.

17,119.—A DUST-COLLECTING APPARATUS: *T. W. Freemen and J. Perry.*—The dust-laden air is caused to flow in a horizontal direction between baffles, from whose smooth surfaces the deposited dust slides down into a conveying-trough beneath; the baffles—semi-circular in section and corrugated—are placed apart in rows in such a manner that the spaces in one row shall be opposite the baffles in the next row, whilst transverse partitions turn the air current away from the collecting-trough.

17,168.—A BAND-SAWING MACHINE: *W. Hartmann.*—The machine is for sawing metal, which remains fixed whilst the band-saw is being fed forwards. The saw is passed over three pulleys whose axes a weight pushes forwards lengthwise, by means of a strap the weight serves to turn a shaft which also presses forwards the shafts of the pulleys by means of levers that are geared together with toothed segments; the specification includes certain variations in the feeding mechanism whereby the toothed segments are discarded for the levers alone.

MEETINGS.

FRIDAY, DECEMBER 21.

Institution of Civil Engineers (Students' Meeting).—Mr. C. E. Inglis, B.A., on "The Use of Geometrical Methods in Investigating Mechanical Problems." 8 p.m.

Glasgow Architectural Craftsmen's Society.—"Conditions of Contract" (Mason, Joiner, and Plumber).—Messrs. R. Aikenhead, J. A. Ferguson, and Isaac Low. 8 p.m.

Architectural Association of Ireland (Technical Demonstrations).—Messrs. Hudman and Tickell on "Hardwoods" (at the Dublin Timber Company, Limited). 4.30 p.m.

SATURDAY, DECEMBER 29.

Royal Victoria Hall (Waterloo-road, S.E.).—Professor Capper on "Niagara Water Power Installation." 8.30 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

December 8.—By H. DUKE & SON (at Dorchester).

Portesham, Dorset.—The Manor Farm, 760 a. 1 r. 3 p., f. £10,900
Steepleton, Dorset.—Samways Tenement, 83 a. 1 r. 25 p., f. 950

December 10.—By ELLIOTT, SON, & BOYTON.

Cavendish-sq.—8, Upper Wimpole-st., and 8, Devonshire Mews South, u.t. 10¼ yrs., g.r. 70*l.* 1,450

By E. J. GILDERS.

Finsbury Park.—148, St. Thomas-rd., u.t. 80 yrs., g.r. 6*l.*, r. 30*l.* 335
Highbury.—132 and 134, Gillespie-rd., u.t. 80¾ yrs., g.r. 10*l.* 10s. 470

By GRAVES & SON.

Bromley, Kent.—34 to 38, Stanley-villas, f., r. 74*l.* 8s. 850
Bayswater.—48, Richmond-rd., u.t. 46 yrs., g.r. 8*l.*, r. 50*l.* 440
Teddington.—Windsor-rd., a plot of land, with erection thereon, f. 110

By ALFRED SAVILL & SON.

Poplar.—Castor-st., copyhold manufacturing premises, area 15,500 ft. 3,000
Clapham.—121 and 127, Clapham Park-rd., f., r. 120*l.* 2,150

By ALFRED RICHARDS (at Tottenham).

Tottenham.—14 and 16, Vicarage-rd., u.t. 78 yrs., g.r. 12*l.* 12s., r. 54*l.* 360
Vicarage-rd., f.g.r. 19*l.*, reversion in 78 yrs. 310
2 and 4, Louise Cottages, f., r. 39*l.* 455
34, Springfield-rd., u.t. 80 yrs., g.r. 4*l.* 10s. 280

December 11.—By KING & CO.

New Barnet, Herts.—1 to 4, Preston Cottages, f. 1,200
Chelsea.—86, Westbourne-st., u.t. 20½ yrs., g.r. nil, r. 45*l.* 380
Brompton.—29, Ifield-rd., u.t. 49 yrs., g.r. 8*l.*, r. 45*l.* 395

By E. & H. LUMLEY.

Beckenham.—53 and 55, Coper's Cope-rd., u.t. 62½ yrs., g.r. 17*l.*, r. 95*l.* 760

By REYNOLDS & EASON.

Poplar.—7, 9, and 11, Alton-st., f. £820
Houndsditch.—16, Gun-sq., f. 710
Aldgate.—2 and 5, Hutchison-st. and 1a, 1 and 2, Hutchison-av., f. 545

By ROUCH, PARKHOUSE, & LUCK.

Hornsey Rise.—514, Hornsey-rd., f., r. 50*l.* 710

By J. S. RICHARDSON.

Bow.—180, Roman-rd., f., r. 79*l.* 1,200
Kentish Town.—51, Victoria-rd., u.t. 34½ yrs., g.r. 5*l.*, r. 50*l.* 400
Pimlico.—56, Hindon-st., and 33, Hindon-pl., u.t. 23½ yrs., g.r. 5*l.*, r. 43*l.* 550
25, Lillington-st., u.t. 23½ yrs., g.r. 5*l.* 5s. 320

By ROGERS, CHAPMAN, & THOMAS.

Chelsea.—540 and 542, King's-rd., u.t. 28 yrs., g.r. 13*l.* 745
Brompton.—107 and 109, Ifield-rd., u.t. 52 yrs., g.r. 16*l.*, r. 84*l.* 775
160, Finborough-rd., u.t. 64 yrs., g.r. 10*l.*, r. 52*l.* 460

By SIM & RANDALL (at Forest Gate).

Forest Gate.—11 and 13, St. George's-rd., f., r. 56*l.* 750

By J. C. PLATT (at Hammersmith).

Hammersmith.—85 and 87, Shaftesbury-rd., u.t. 52½ yrs., g.r. 12*l.*, r. 78*l.* 845
Acton.—5, Kingswood-rd., f., e.r. 39*l.* 360

By JAMES STRAKER & SON (at Abergavenny).

Clodock, Hereford.—The Great Cwm Farm, 179 a. 2 r. 24 p., f. and c. 2,500
Great Blackhill Farm, 143 a., f. and l. 1,625
Abergavenny, Monmouth.—An enclosure, 2 a. 2 r. 39 p., f. 150

December 12.—By G. F. BOX & CO.

Hoxton.—76, Murray-st., u.t. 41½ yrs., g.r. 4*l.* 4s., r. 35*l.* 375

By H. J. BROMLEY.

Forest Hill.—31, Perry-vale, u.t. 60 yrs., g.r. 5*l.*, r. 70*l.* 1,000

By PHIBBS, GIBSON, & CO.

Dulwich.—160, Rosendale-rd., f., e.r. 65*l.* 760

By ROGERS, CHAPMAN, & THOMAS.

Kensington.—Blythe-rd., f.g.r. 11*l.* 10s., reversion in 29½ yrs. 550

By TOWERS, ELLIS, & CO.

Bayswater.—24 and 30, Westbourne Park-rd., u.t. 44½ yrs., g.r. 18*l.*, r. 170*l.* 2,280
14, Westbourne Park-villas, u.t. 44¼ yrs., g.r. 9*l.*, e.r. 55*l.* 700
Paddington.—82, Praed-st., u.t. 21 yrs., g.r. 6*l.*, r. 65*l.* 520
Ealing.—9, Lothair-rd., u.t. 57 yrs., g.r. 5*l.*, r. 26*l.* 200

By WAGSTAFF & SONS.

Paddington.—34 and 36, Ashmore-rd., u.t. 78 yrs., g.r. 12*l.*, r. 80*l.* 890

By DOUGLAS YOUNG & CO.

Kentish Town.—45, Patshull-rd., u.t. 61 yrs., g.r. 7*l.*, r. 48*l.* 600
Wandsworth.—1, Lebanon Gardens, u.t. 77 yrs., g.r. 6*l.* 10s., e.r. 36*l.* 360

By Messrs. SPELMAN (at Norwich).

Norwich.—2 to 6, Eagle Walk, f. 590
Eagle Walk, a plot of freehold land 115
Allen's-lane, house and market garden, area ½ acre, f. 400

By WYATT & SON (at Chichester).

Sidlesham, Sussex.—Copyhold business premises and house and cottage adjoining 420

December 13.—By H. J. BLISS & SONS.

Bethnal Green.—33, Abbey-st., f. 650
5, Winchester-st., f. 195
11, Ramsay-st., f. 450
214, Green-st., f., r. 48*l.* 655
65, Moss-st., f. 180
St. George's East.—102, Cable-st., f., r. 26*l.* 415

By FAREBROTHER, ELLIS, & CO.

St. John's Wood.—88, Finchley-rd., u.t. 33 yrs., g.r. 4*l.* 1,200
Anerley.—11, Weighton-rd., u.t. 65 yrs., g.r. 15*l.*, r. 55*l.* 300

By GLASIER & SONS.

Hampstead-rd.—68, Oakley sq., u.t. 43 yrs., g.r. 14*l.*, r. 70*l.* 720

By HARDS & BRADLY.

Charlton, Kent.—9, 11, 13, and 15, Fossdene-rd., u.t. 90 yrs., g.r. 18*l.* 1,210
Rotherhithe.—3, Adam-st., f. 190
20, Clarence-st., f. 205

By C. C. & T. MOORE.

Commercial-rd. East.—14, East-st. and 7a, Old Church-rd., f. 710
6 and 8, Stepney Causeway, f., r. 75*l.* 1,350
Limehouse.—112, Elsa-st., f., r. 39*l.* 425
Poplar.—7 to 19 (odd), Broomfield-st., u.t. 52 yrs., g.r. 19*l.* 5s. 980
Bow.—62 and 64, Wellington-rd., f. 650
Spitalfields.—23, 25, and 27, Wilkes-st., f., r. 178*l.* 10s. 3,650
Bow.—153, Malmesbury-rd., e.r. 32*l.*; also i.g.r's 12*l.* 12s., u.t. 47 yrs., g.r. 16*l.* 16s. 300
105, Tredegar-rd., u.t. 58 yrs., g.r. 5*l.* 380
141, Antill-rd., u.t. 62 yrs., g.r. 4*l.* 10s. 295
Mile End.—4 and 18, Medway-rd., u.t. 49 yrs., g.r. 8*l.* 640
220 to 226 (even), Devonshire-st., and 1 to 8, May's-bldgs., u.t. 16½ yrs., g.r. 8*l.* 800
Poplar.—Pekin-st., f.g.r. 11*l.*, reversion in 45 yrs. 280

By STIMSON & SONS.

Brixton.—70 to 86 (even), Arlingford-rd., u.t. 74½ yrs., g.r. 76*l.* 10s., r. 376*l.* (in lots) 3,875
Lambeth.—35, Sutton-st., u.t. 15 yrs., g.r. 6*l.* 7s. 6d., r. 35*l.* 180
Bow.—148, Turner's-rd., u.t. 60 yrs., g.r. 5*l.*, r. 40*l.* 330
Clapton.—25, Inver-rd., u.t. 78½ yrs., g.r. 5*l.* 170
Walworth.—35 and 37, South-st., f. 640
Peckham.—12, Talfourd-pl., u.t. 58 yrs., g.r. 6*l.*, r. 28*l.* 285
61, Blake's-rd., u.t. 63¾ yrs., g.r. 4*l.* 250

By WM. STEVENS.

Canning Town.—2 and 4, Nelson-st., u.t. 55 yrs., g.r. 20*l.* 190

By J. A. & W. THARP.

Bethnal Green.—3, Bacon-st., 1, 3, and 5, Cygnet-st., also The Champion beer-house, u.t. 45 yrs., g.r. 21*l.* 1,910

By FOSTER & CRANFIELD (at Oswestry).

Oswestry, &c., Salop.—The Ford's Farm, 117 a. 2 r. 35 p., f. £4,375

By T. W. MEPHAM (at Forest Gate).

Forest Gate.—100 and 102, Clova-rd., f., r. 68*l.* 1,220
31 and 33, Studley-rd., f. 585
49, Elmhurst-rd., u.t. 86 yrs., g.r. 3*l.* 10s., r. 26*l.* 230
46, Wolseley-rd., u.t. 86 yrs., g.r. 3*l.* 5s. 205
Shrewsbury-rd., f.g.r. 8*l.*, reversion in 95 yrs. 205
Ilford, Essex.—1 and 2, Denver-villas, u.t. 81 yrs., g.r. 8*l.* 215

December 14.—By B. PERCY ABRAMS.

East Ham.—117 and 133 (odd), Roman-rd., f., r. 175*l.* 10s. 1,620

By BELLHAM, WILLIAMS, & CO.

Wimbledon.—4, 6, 8, and 10, Norman-rd., u.t. 99 yrs., g.r. 20*l.* 735

By BROWETT & TAYLOR.

Islington.—371 and 371a, Essex-rd., u.t. 47 yrs., g.r. 8*l.* 8s., r. 68*l.* 670
Tooting.—Fortescue-rd, f.g.r. 20*l.*, reversion in 98 yrs. 490
51, Beechcroft-rd., u.t. 65 yrs., g.r. 4*l.* 15s. 230
Brixton.—Dalberg-rd., f.g.r. 13*l.* 2s. 6d., reversion in 72 yrs. 332

By JONES, LANG, & CO.

City of London.—119, Fleet-st., area 1,530 ft., f., r. 150*l.* 4,350
Kilburn.—81 and 83, Lancefield-st., f., r. 85*l.* 1,150
34 and 36, Salusbury-rd., u.t. 78¾ yrs., g.r. 21*l.*, r. 175*l.* 2,270

By MOSS & JAMESON.

Camden Town.—35, Camden-rd., u.t. 39 yrs., g.r. 12*l.*, e.r. 80*l.* 630

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks	1	16	0	per 1,000	alongside, in river.	
Rough Stocks and Grizzles	1	12	0	,,	,,	,,
Smooth Bright Facing Stocks..	2	18	0	,,	,,	,,
Shippers	2	6	0	,,	,,	,,
Flettons.....	1	10	6	,,	at railway depôt.	
Red Wire Cuts ..	1	15	6	,,	,,	,,
Best Fareham Red	3	11	6	,,	,,	,,
Best Red pressed Ruabon Facing.	5	5	0	,,	,,	,,
Best Blue Pressed Staffordshire ..	4	7	0	,,	,,	,,
Do., Bullnose	4	12	0	,,	,,	,,
Best Stourbridge Fire Bricks	4	4	6	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers.....	13	0	0	,,	,,	,,
Headers	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	17	0	0	,,	,,	,,
Double Stretchers	19	0	0	,,	,,	,,
Double Headers..	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,
Two Sides and one End	20	0	0	,,	,,	,,
Splays, Chamfered, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers and Headers ..	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	14	0	0	,,	,,	,,
Double Stretchers	15	0	0	,,	,,	,,
Double Headers..	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamfered, Squints	14	0	0	,,	,,	,,
Seconds Quality White and Dipped Salt Glazed	2	0	0	,,	less than best.	

	s.	d.	
Thames and Pit Sand	8	0	per yard, delivered.
Thames Ballast	6	9	,, ,,
Best Portland Cement	38	0	per ton ,,
Best Ground Blue Lias Lime..	24	6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s.	d.	
Ancaster in blocks ...	2	0	per ft. cube, deld. rly. depôt
Bath ,, ...	1	7	,, ,,
Farleigh Down Bath ..	1	8	,, ,,
Beer in blocks	1	6½	,, ,,
Grinshill ,, ...	1	10	,, ,,
Brown Portland in blocks	2	2	,, ,,

[*See also next page.*]

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Cottages	Tanfield (Durham) U.D.C.	10*l.*, 5*l.*	Jan. 23
*Alterations, &c., to Petty Sessional Court and Offices	Bristol County Council	100*l.*, 50*l.*	Feb. 13

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Underground Conveniences	Bradford Corporation	F. Stevens, Town Hall, Bradford	Dec. 26
Flint Road Metal	Wilton (Wilts) U.D.C.	W. H. Musselwhite, Borough Surveyor, Ditchampton, Wilton	do.
Granite Setts	Rochdale Corporation	Borough Surveyor, Town Hall, Rochdale	do.
Alterations, &c., to Council Offices, Woolston, Hants	Itchen U.D.C.	T. A. Collingwood, Surveyor, Bridge-road, Woolston	Dec. 27
Building Works (3 contracts)	Nottingham Corporation	W. Smith, Surveyor, Town Hall	do.
Macadam	East Stonehouse (Devon) U.D.C.	A. W. Debnam, Surveyor, Town Hall, East Stonehouse	do.
Paving and Flagging Belle Vue-street, &c.	Leeds Corporation	City Engineer, Municipal Buildings	do.
Street Paving Works	Salford Corporation	L. C. Evans, Town Hall, Salford	do.
Lime	Haworth (Yorks) U.D.C.	W. Robertshaw, North-street, Keighley	do.
Sett Paving, Green Bat	Alnwick U.D.C.	G. Wilson, Surveyor, Council Offices, Alnwick	do.
Road Works, Edward-street, &c.	Withington (Lancs) U.D.C.	A. H. Mountain, Civil Engineer, Town Hall, Withington	do.
Cast-iron Pipes and Laying, Auchindoors	Port Glasgow Burgh Commrs.	W. R. Copland, Civil Engineer, 146, West Regent-street, Glasgow	Dec. 28
Refuse Destructor, &c.	Salisbury Corporation	A. C. Bothams, Civil Engineer, Municipal Offices, Salisbury	do.
Alterations to Fish Market, Albion-street	Halifax Corporation	J. Lord, Civil Engineer, Town Hall, Halifax	do.
Recreation Ground Works, Exeter	.....	Ellis, Son, & Bowden, Surveyors, Exeter	do.
Alterations to Church, Whitchurch, Salop	.....	W. Webb, Architect, 6, Bargate, Whitchurch	Dec. 29
Sewers, &c.	St. Annes-on-Sea U.D.C.	H. Bancroft & Son, Civil Engineers, 88, Mosley-st., Manchester	do.
Additions to Police Station, Wigton, Cumberland	.....	G. Dale Oliver, Architect, Carlisle	do.
Road Works, Queen's-road, &c.	Hayward's Heath U.D.C.	E. Waugh, Council Offices, Haywards Heath	do.
Road Works, St. John's-road	Knutsford U.D.C.	W. J. Downes, Surveyor, Knutsford	Dec. 31
Cemetery Paths, Road, &c., Tabley Hill	do.	do.	do.
Setts, Kerbs, &c.	Pemberton (Lancs) U.D.C.	P. Partington, Council Offices, Pemberton	do.
Electric Lighting Plant	Leeds City Council	H. Dickinson, 1, Whitehall-road, Leeds	do.
Road Works, College-road, Heswall	Wirral R.D.C.	T. Davies, Surveyor, Eastham	Jan. 1
Additions to Laundry	Kingston-on-Thames Guardians	J. Edgell, Union Offices, Kingston-on-Thames	do.
Quay, The Hythe	Colchester Corporation	H. Goodyear, Borough Surveyor, Colchester	do.
Warehouse, Peckover-street, Bradford	.....	Milnes & France, Architects, Bradford	do.
Public Conveniences	Leicester Corporation	E. G. Mawbey, Civil Engineer, Town Hall, Leicester	do.
Road Works	Hailsham (Sussex) R.D.C.	J. Huxley, Civil Engineer, 9, Wellington-terrace, Hailsham	do.
Police Station, Poynton, Cheshire	.....	H. Beswick, Architect, Newgate-street, Chester	do.
Sewerage Works, Kessingland, near Lowestoft	.....	F. H. Anson, Engineer, 15, Dean's-yard, Westminster, S.W.	do.
Drainage Works, Stroud-lane	Dover Town Council	H. E. Stilgoe, Civil Engineer, Town Hall, Dover	do.
Business Premises, Leicester	Nat. Union of Boot & Shoe Oper	Harrison & Hattrell, Architects, 34, Friar-lane, Leicester	do.
Chapel, Mountain Ash, Wales	English Baptist Trustees	T. W. Millar, Architect, Mountain Ash	do.
School, Lexden-road	Colchester Grammar SchoolGovnrs	H. Goodyear, Borough Surveyor, Colchester	do.
Whinstone Road Metal, &c.	Felling (Durham) U.D.C.	H. Miller, Civil Engineer, Council Offices, Felling	Jan. 2
Electric Tram Depôt, Pendyris-street	Cardiff Corporation	W. Harpur, Civil Engineer, Borough Engineer, Cardiff	Jan. 3
School and House, near Diss, Norfolk	Fersfield School Board	H. Winkworth, Architect, 3A, Hatton-court, Ipswich	Jan. 4
Road Works, Albert-road, &c.	St. Annes-on-Sea U.D.C.	T. Bradley, Council Offices, St. Annes	Jan. 5
Forty-five Houses, Greetland, Halifax	.....	R. Horsfall & Son, Architects, 22A, Commercial-street, Halifax	do.
Building Work at Town Hall	Larne (Ireland) U.D.C.	W. G. Younge, Town Hall, Larne	do.
*Isolation Hospital	Rochford R.D.C.	R. L. Curtis & Son, 119, London-wall, E.C.	Jan. 7
*Supplying and Fixing Radiators	Metropolitan Asylums Board	Offices, Embankment, E.C.	do.
*Electric Light Station and Destructor	Whitby U.D.C.	Clerk, Council Offices, Whitby, Yorks	Jan. 8
*Removal of House Refuse, &c.	St. Marylebone Borough Council	Town Hall, St. Marylebone, W	Jan. 10
Fire Engine House	Lambourn (Berks) Parish Council	H. J. Maberly, Market Place, Lambourn	do.
Electric Lighting Plant	Rathmines (Ireland) Town Council	R. Hammond, Civil Engineer, 64, Victoria-street, Westminster	do.
Refuse Destructor	West Bridgford (Notts) U.D.C.	W. Pare, Civil Engineer, George-road, West Bridgford	do.
*Schools	Hanwell School Board	See Advertisement	Jan. 14
Extension of Police Station	Preston (Lancs) Corporation	Borough Surveyor, Town Hall	Jan. 17
*New Infirmary, &c	Swindon & Highworth Guardians	See Advertisement	Feb. 25
Alterations to Welcome Home, Ashton-under-Lyne	.....	Eaton & Co., Architect, Aston-under-Lyne	No date
Alterations to Miners Arms Inn, Ashton-under-Lyne	.....	do.	do.
Street Works, Long Benton, Newcastle-on-Tyne	.....	C. S. Errington, Architect, 21, Grainger-street West, Newcastle	do.
Drainage Works, Iscoed, Ferryside	.....	Jones & Co., Architects, 18, St. Mary-street, Cardiff	do.
Alterations to Stag Inn, Finningley, near Doncaster	.....	W. Gill, Cattle Market, Doncaster	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Application to be in
*Road Foreman	Heaton and Isleworth U.D.C.	2*l.* 10*s.* per week	Dec. 31
*Assistant Surveyor	Croydon School Board	150*l.* per annum	Jan. 5
Surveyor, &c.	Witham Drainage Commrs. Boston	300*l.* per annum	Jan. 8
*Building Inspector	Tottenham U.D.C.	150*l.* per annum	Jan. 9
*Engineering Assistant	London County Council	300*l.* per annum	do.
*Clerk of Works	Wirral R.D.C.	3*l.* per week	No date
Assistant Surveyor	Southport Corporation	100*l.* per annum	do.

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv.. Contracts, pp. iv. vi. viii. x. & xviii. Public Appointments, pp. xvii. & xviii.

PRICES CURRENT (*Continued*).

STONE.

	s. d.		
Darley Dale in blocks	2 1½	per ft. cube, deld. rly. depôt.	
Red Corsehill	2 5	"	"
Red Mansfield	2 4½	"	"
Hard York in blocks	2 10	"	"
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super. at rly. depôt.	
" " 6 in. Rubbed Ditto	3 0	"	"
" " 3 in. sawn both sides slabs (random sizes)	1 3	"	"
" " 3 in. self-faced Ditto	0 9½	"	"

PRICES CURRENT (*Continued*).

SLATES.

in. in.	£ s. d.	
20×10 best blue Bangor	11 5 0	per 1000 of 1200 at ry. dep.
" best seconds	" 10 15 0	" "
16× 8 best	" 6 2 6	" "
20×10 best blue Portmadoc	10 18 0	" "
16× 8 best blue Portmadoc	6 0 0	" "
20×10 best Eureka unfading green	11 2 6	" "
16× 8 " "	6 15 0	" "
20×10 Permanent green	10 0 0	" "
16× 8 " "	5 12 6	" "

PRICES CURRENT (*Continued*).

TILES.

	s. d.		
Best plain red roofing tiles	41 6	per 1,000 at rly. depôt	
Hip and valley tiles	3 7	per doz.	" "
Best Broseley tiles	48 6	per 1,000	" "
Hip and valley tiles	4 0	per doz.	" "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	" "
Do. ornamental Do.	60 0	"	" "
Hip tiles	4 0	per doz.	" "
Valley tiles	3 9	"	" "
Best Red or Mottled Staffordshire Do. (Peakes)	50 9	per 1,000	" "
Hip tiles	4 1	per doz.	" "
Valley tiles	3 8	"	" "

PRICES CURRENT (*Continued*).

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "
	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch pine timber (35 ft. average)	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
" " 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens	12 10 0	13 10 0
White Sea and Petersburg:		
First white deals, 3 in. by 11 in.	15 10 0	16 10 0
" " " 3 in. by 9 in.	14 0 0	15 0 0
Battens	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
" " " 3 in. by 9 in.	13 0 0	14 0 0
" " battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 9
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	9 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small " "	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
¾ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	8 7 6	9 7 6
Compound Girders " "	10 5 0	11 10 0
Angles, Tees and Channels, ordinary sections	11 2 6	13 2 6
Flitch Plates	11 0 0	11 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	9 15 0	- - -
Staffordshire Crown Bars, good merchant quality	10 5 0	10 10 0
Staffordshire "Marked Bars"	12 0 0	- - -
Mild Steel Bars	10 10 0	11 0 0
Hoop Iron, basis price	10 10 0	11 0 0
" " galvanised	16 10 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 0 0	- - -
" " to 24 g.	12 0 0	- - -
" " to 26 g.	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	13 5 0	- - -
" " 22 g. and 24 g.	14 5 0	- - -
" " 26 g.	16 0 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	17 10 0	- - -
" " 22 g. and 24 g.	18 0 0	- - -
" " 26 g.	19 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 10 0	- - -
" " 22 g. and 24 g.	14 0 0	- - -
Cut nails, 3 in. to 6 in.	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	19 15 0	- - -
Pipe in coils	20 5 0	- - -
Soil Pipe	23 5 0	- - -

PRICES CURRENT (*Continued*).

METALS.

	Per ton, in London. £ s. d.	£ s. d.
ZINC—Sheet—		
Vieille Montagne ton	27 0 0	- - -
Silesian	26 10 0	- - -
COPPER—		
Strong Sheet per lb.	0 1 1	- - -
Thin "	0 1 3	- - -
Copper nails "	0 1 3	- - -
BRASS—		
Strong Sheet "	0 0 11	- - -
Thin " "	0 1 1	- - -
TIN—English Ingots "	0 1 5	- - -
SOLDER—Plumbers' "	0 0 7½	- - -
Tinmen's "	0 0 9½	- - -
Blowpipe "	0 0 11	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2¾d. " "
21 oz. thirds	3½d. " "
" " fourths	3d. " "
26 oz. thirds	4½d. " "
" " fourths	4d. " "
32 oz. thirds	5½d. " "
" " fourths	5d. " "
Fluted sheet, 15 oz.	3½d. " "
" " 21 "	4½d. " "
½ Hartley's Rolled Plate	3d. " "
⅝ " " "	3½d. " "
¾ " " "	4d. " "

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 2 11
" " " in barrels "	0 3 0
" " " in drums "	0 3 2
Boiled " " in pipes "	0 3 2
" " " in barrels "	0 3 3
" " " in drums "	0 3 5
Turpentine, in barrels "	0 2 9
" in drums "	0 2 11
Genuine Ground English White Lead ...per ton	27 10 0
Red Lead, Dry "	24 10 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 10 0

VARNISHES, &c.

	per gallon £ s. d
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

T. H. (Amount should have been stated.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BASFORD (Notts).—For additions to hospital for the Guardians. Mr. W. V. Betts, architect, Radford-road, Old Basford:—

W. C. Shaw	£1,942 0 0	W. J. Hutchinson	£1,689 15 6
J. Greenwood	1,820 0 0	A. B. Clarke	1,687 12 4
J. Cooper	1,745 0 0	W. Maule	1,664 0 0
J. G. Thomas	1,737 0 0	G. Hopewell & Son, Old Basford*	1,650 0 0
J. Attenborough	1,700 0 0		

DARTFORD.—For the erection of an electric-light station, for the Urban District Council. Messrs. Hesketh & Stokes, architects, 110, Cheapside, E.C.:—

T. Martin	£8,943	Perry Bros.	£5,807
Leslie & Co., Ltd.	6,537	Smith & Sons, Ltd.	5,619
J. Lonsdale	5,935	Somerford & Son*	4,906

DONCASTER.—For the erection of schools and house, Owston, for the Owston and Skellow School Board. Mr. J. Simmons, architect. Quantities by architect:—

Sprakes & Sons	£2,053	G. Mottram, Queen's-road, Doncaster*	£1,750
Gill & Son	1,877		
Arnold & Son	1,780		

EDMONTON.—For completion of four cottages, Montagu-road, Edmonton, for Mr. B. S. Dimmock. Mr. A. E. Mullins, architect and surveyor, 16, Church-street, Camberwell Green, S.E.:—

A. Mitchell* £473 12 6

FALKLAND (Fifeshire).—For the execution of water supply works (Contracts Nos. 1 and 2) for the Police Commissioners. Mr. Henry Bruce, C.E., Cupar:—

	Contract No. 1.	Contract No. 2.
Strachan & Son, Chance Inn, Cupar*	£403 14 9½	£230 8 8½
R. Ness, Newton of Falkland	458 19 5½	503 15 2½
Mackay & Son, Broughty Ferry	474 14 3½	289 12 7½
Gray & Co., Kirkcaldy	477 19 10½	322 0 8
R. Gilmour, Strathmiglo	482 4 0	225 19 6½
W. Brown, Kirkcaldy	511 1 6½	—
A. Darling, Kirkcaldy	538 12 0	451 10 10½
Mitchell & Son, Dundee	553 0 2½	266 14 10
P. Beaton, Kirkcaldy	578 6 2½	413 14 3
W. Caragher, Dunfermline	585 15 11	426 3 4
J. Kennedy, Kirkcaldy	612 13 5	313 13 7½
J. Martin, Dunfermline	615 13 0	349 17 0
Henderson & Son, Markinch	670 3 0	737 0 6

HANDSWORTH (Staffs).—For making up Hutton road for the Urban District Council. Mr. H. Richardson, C.E., Council House, Handsworth:—

J. Biggs	£2,424 0	Fitzmaurice & Co.	£2,243 0
G. Law	2,249 0	J. White, jun.	1,976 15
Currall, Lewis, & Martin	2,246 0	G. Trentham, Handsworth*	1,848 0

HARROGATE.—For the drainage and formation of three new roads, St. James's Park Estate. Mr. Samuel Stead, C.E., 33, James-street, Harrogate:—

Roger W. Barker, Church-square, Harrogate Over £3,000

LONDON.—For taking down and rebuilding the Dundee Arms Hotel, Artillery-street, Bermondsey, for Messrs. Noakes and Co., Limited. Mr. G. W. Thompson, architect. Quantities by Mr. C. A. Priestley, 35, Norfolk-street:—

		Extra for Granite.	Total.
Bullers	£10,400	£500 0 0	£10,900 0 0
Laurance & Sons	9,046	—	—
Rider & Sons	8,669	500 0 0	9,169 0 0
Patman & Fotheringham	8,111	482 0 0	8,593 0 0
Downs	7,893	510 0 0	8,403 0 0
Lole & Lightfoot	7,859	466 0 0	8,325 0 0
G. Newton*	7,649	453 5 6	8,102 5 6

LONDON.—For the erection of new drying and stamp rooms, for the Vinolia Company, Limited, Stratford. Mr. S. S. Dottridge, architect, Albert Buildings, Queen Victoria-street, E.C. Quantities by Mr. F. R. Smith, 6, Great College-street, Westminster:—

Gregar & Sons	£2,888	Weibking & Son	£2,585
Falkner & Sons	2,781	Munday & Son*	2,503
Outhwaite & Son	2,726		

LONDON.—For the erection of a receiving-house for children and nurses' home, Broad-street, W.C., for the Guardians of the Poor of St. Giles-in-the-Fields and St. George, Bloomsbury. Mr. J. Grafton Izard, architect, 5, Bloomsbury-square, W.C. Quantities by Messrs. Gardiner & Theobald, 110, Great Russell-street, W.C.:—

F. & H. F. Higgs	£14,150	King & Son	£12,290
T. C. Sharpington	13,750	H. L. Holloway	12,000
Foster Bros.	13,539	W. J. Renshaw	11,989
Courtney & Fairbairn	13,221	Smith & Sons	11,892
Todd & Co.	13.069	J. Appleby	11,890
Hibberd Bros., Ltd.	13,068	Prestige & Co.	11,777
B. E. Nightingale	12,555	A. Bush, 6a, Ridgmount-street, W.C.*	11,586
C. Ansell	12,521		
H. Wall & Co.	12,392		

[Architect's estimate, £12,114.]

LONDON.—For electric lighting, Grove Park Workhouse. Mr. Thomas Dinwiddy, architect, 54, Parliament-street, S.W., and Greenwich:—

Pearson & Co.	£7,550	Samuel G. Cozens	£6,140
Troy & Co.	7,394	Collins Bros.	5,921
National Electric Wiring Co.	7,350	Foote & Milne	5,763
Hampton & Sons	6,598	Johnson & Phillips	5,550
Barlow Bros. & Co.	6,400	Joel & Co.	5,456
Drake & Gorham	6,380	Dawson & Co.	5,014
Geipel & Lange	6,278	Lea & Warren	4,910
		Cook & Co.	4,338

[Architect's estimate, £5,500.]

LONDON.—For alterations, &c., at Nos. 67 and 71, Russell-square, Bloomsbury, W.C., for the National Union of Teachers. Mr. A. E. Mullins, architect and surveyor, 16, Church-street, Camberwell Green, S.E.:—

Cox	£758	Phelps & Bisiker	£650
Burman & Sons	692	Lee	648
Marsland	676	Smith*	617

LONDON.—For repairs, &c., at Relief Station, Peckham Park-road, for the Camberwell Guardians. Mr. A. E. Mullins, architect and surveyor, 16 Church-street, Camberwell Green, S.E.:—

W. Wright* £165 2 3

LONDON.—For rebuilding No. 77, Warham-street, Kennington, S.E., for Mr. G. Moss. Mr. A. E. Mullins, architect and surveyor, 16, Church-street, Camberwell Green, S.E.:—

Wood & Co.	£289	N. & G. Mallett	£280
Rice & Son	285	J. Gedye*	257

[*See also next page.*

LONDON.—For additions and alterations at Nos. 51, 53, 55, and 57, Commercial-road, Peckham, S.E. Mr. A. E. Mullins, architect and surveyor, 16, Church-street, Camberwell Green, S.E.:—

J. H. Thompson* £720

MANSFIELD.—For the erection of a schoolroom, Shirebrook, for the Methodist Free Church. Mr. Jos. Perkin, architect, Shirebrook, near Mansfield. Quantities by architect:—

F. H. & J. W. Moore	£725 0	L. Green	£684 5
J. Greenwood	700 0	J. H. Reavill, Ollerton, Notts*	661 15
T. Hutchinson	693 15		

NEWMARKET.—For the erection of engine and destructor houses, &c., Exning-road, for the Urban District Council:—

W. Manders	£12,433 12	A. J. Bateman	£10,577 0
J. G. Cowell	10,990 0	H. J. Linzell, Newmarket†	10,497 0
Scales & Robins	10,700 0		

PLYMOUTH.—For alterations and additions to the Laira Green Schools for the Plymouth School Board. Mr. Henry J. Snell, architect, Plymouth:—

Lethbridge & Son	£16,390	Wakeham Bros.	£14,266
A. Andrews	16,325	J. Berry	14,144
P. Blowey	16,300	Lapthorn & Co.	13 379
Tozer & Son	16,225	J. Paynter	13,268
W. Trevena	16,200	Blackell & Son	12,853
T. May	15,890	W. G. Goad	11,545

[All of Plymouth.]

SHREWSBURY. — For the construction of about 1,000 yards of garden walk for Mr. L. S. Dyer, Westhope, Shropshire. Messrs. Hall & Steavenson, surveyors, College Hill, Shrewsbury:—

E. Thomas, Aughton, Liverpool.
By schedule of prices.

SIDCUP.—For new children's homes, Sidcup, Kent. Mr. Thomas Dinwiddy, architect, 54, Parliament-street, S.W., and Greenwich:—

		Add Roads and Fences.	Total.
Martin Wells & Co.	£120,000	£8,553	£128,553!
White & Son	121,115	7,200	128,315
Leslie & Co.	113,360	11,740	125,100
W. Mills	115,736	8,347	124,083
B. E. Nightingale	110,000	10,150	120,700
Wm. Shepherd	111,490	7,923	119,413
Holloway Bros.	104,800	9,450	114,250
Killby & Gayford	104,100	9,600	113,700
Thomas & Edge	104,000	9,530	113,530
C. Wall	105,370	7,700	113,070
J. J. Wise	106,000	6,000	112,000
Wallis & Sons	103,895	8,100	111,995
H. L. Holloway	100,900	9,300	110,200
T. Rowbotham	100,654	7,123	107,777
Pattinson & Son	97,245	6,795	104,040!

[Architect's estimate, £108,500.]

SPENNYMOOR (Co. Durham).—For the erection of isolation hospital, Merrington-road, for the Urban District Council. Mr. G. W. Rogers, C.E., Spennymoor:—

Blackett	£4,399 0 11
G. H. Bell	3,434 2 0
T. Hilton, Bishops Auckland*	3,031 19 8

SWADLINCOTE.—For the erection of farm buildings, Stanton. Mr. Thos. Kidd, surveyor, Swadlincote. Quantities by surveyor:—

Selby Bros.	£606 19 10	M. Maddock	£485 8 6½
A. Bradbury	537 19 1½	Jno. Beard	468 19 11
W. Wood	503 11 1	Edwin Clarke, Swadlincote*	464 15 2
M. Chamberlain	495 15 4		

C. B. N. SNEWIN

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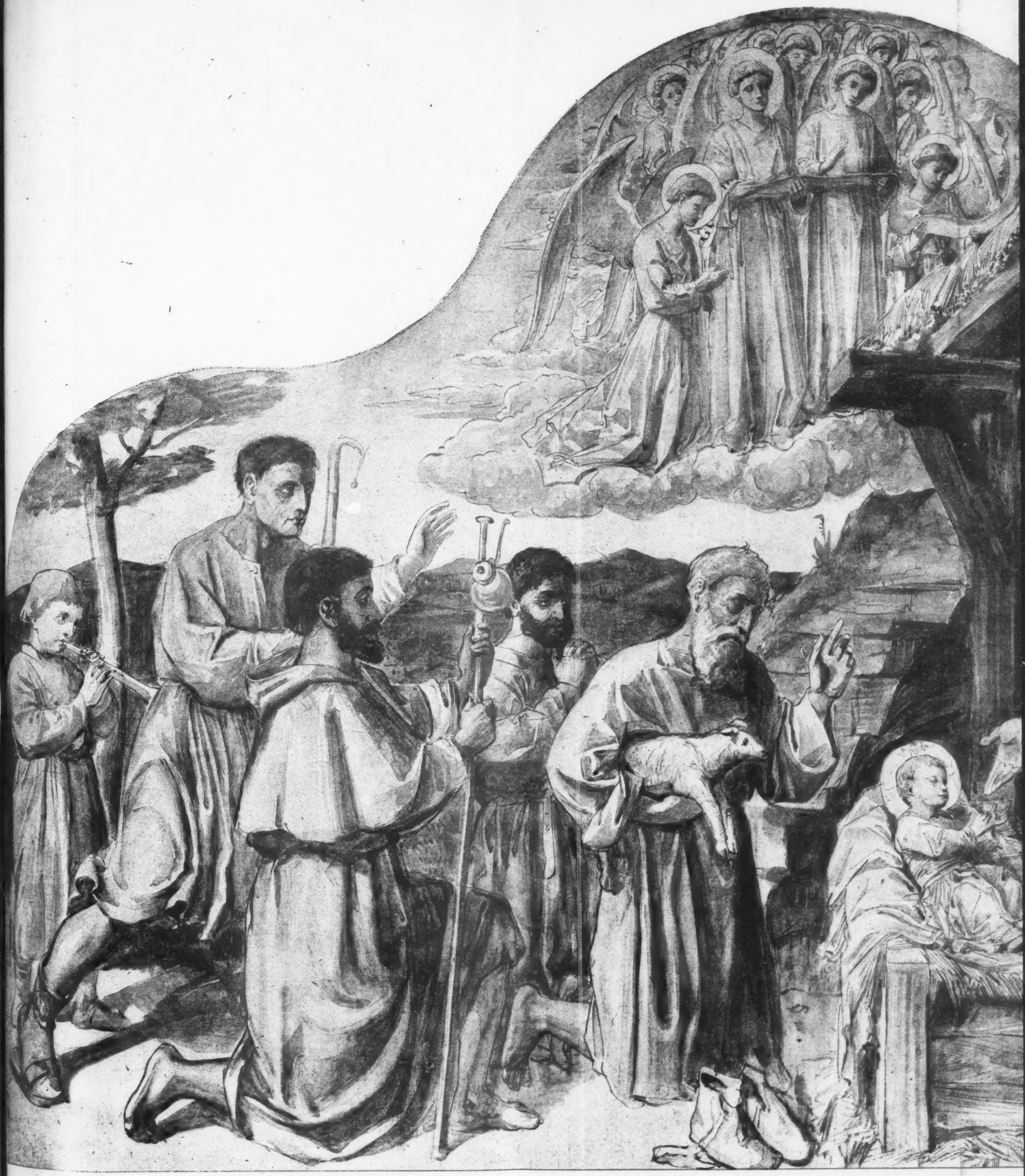

THE NATIVITY—CARTOON FOR WALL DECORATION FOR A CHURCH.—By Mr

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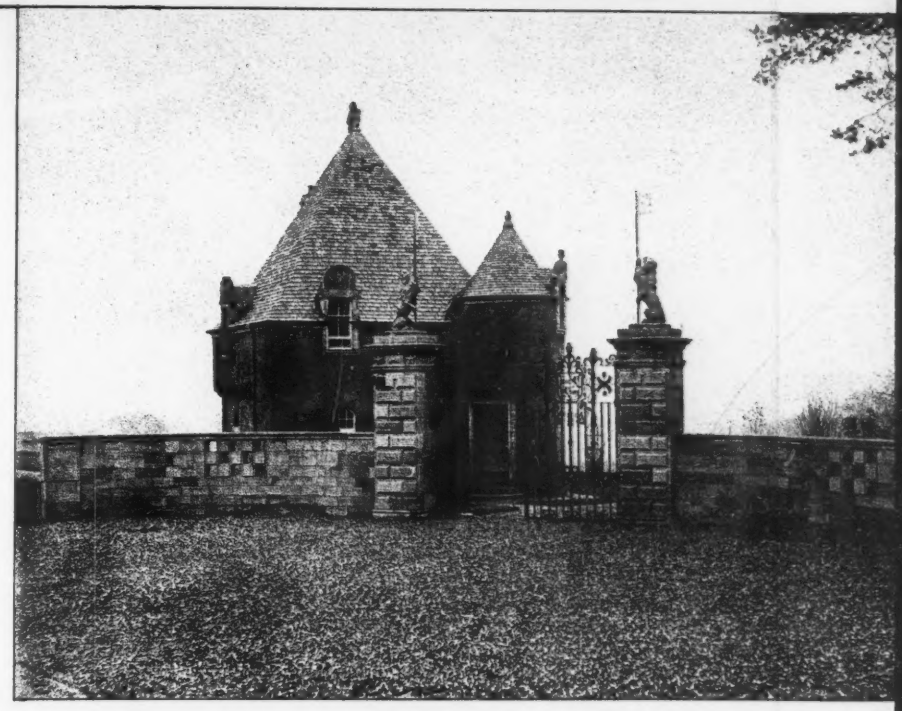
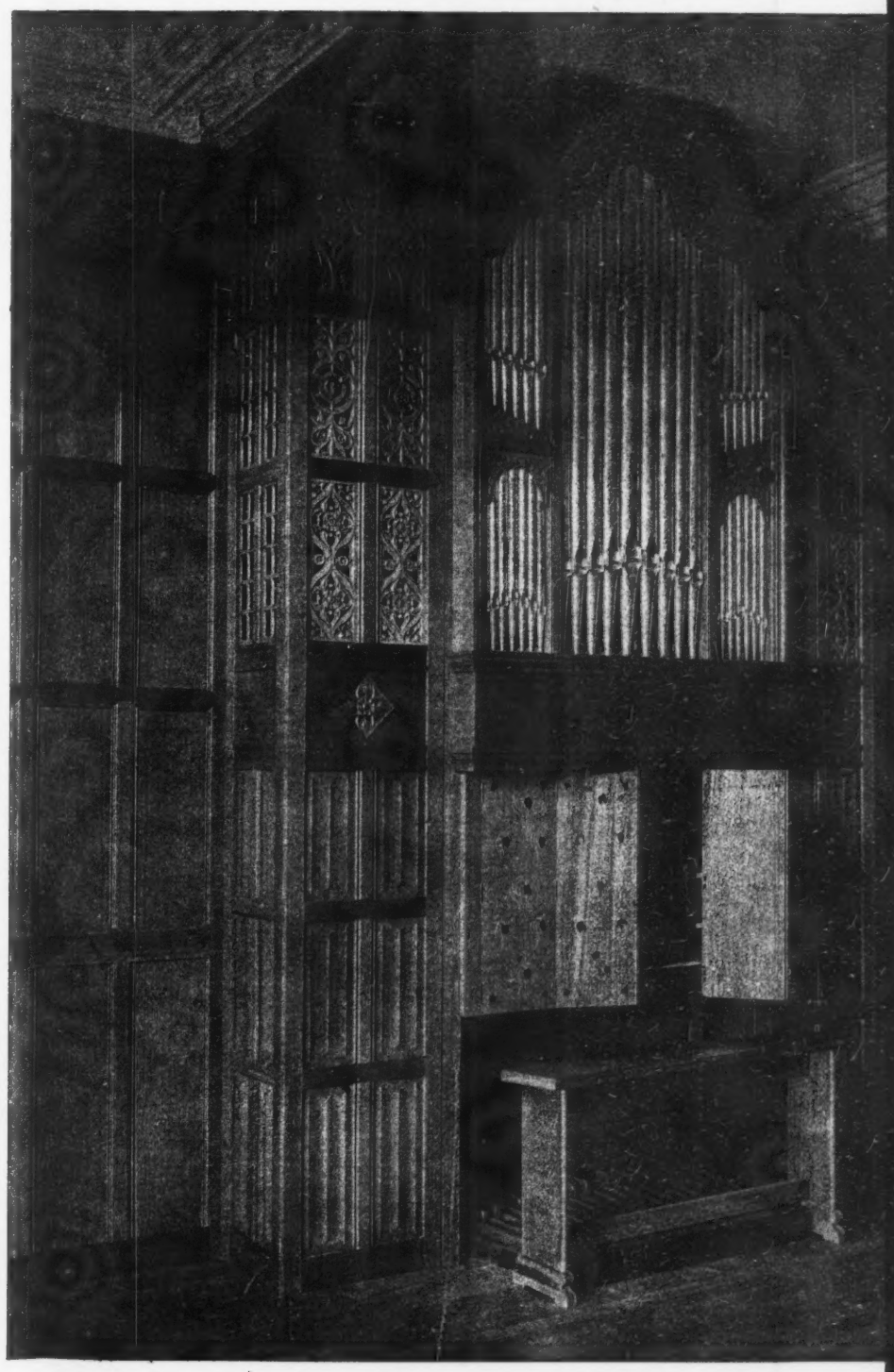
MR. N. H. J. WESTLAKE, F.S.A.

GATE AND GATE-PIER, BALCARRES.



NEW GATE-HOUSE, BALCARRES.

END OF BRIDGE PARAPET, MINTO.



ORGAN-CASE, ELLARY, ARGYLLSHIRE.

DETAILS OF RECENT WORK BY MR. R. S. LORIMER, A.R.I.B.A

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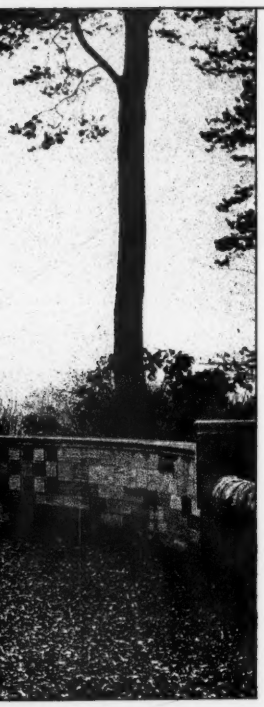

PILLAR IN A GARDEN.

END OF BRIDGE PARAPET, MINTO.

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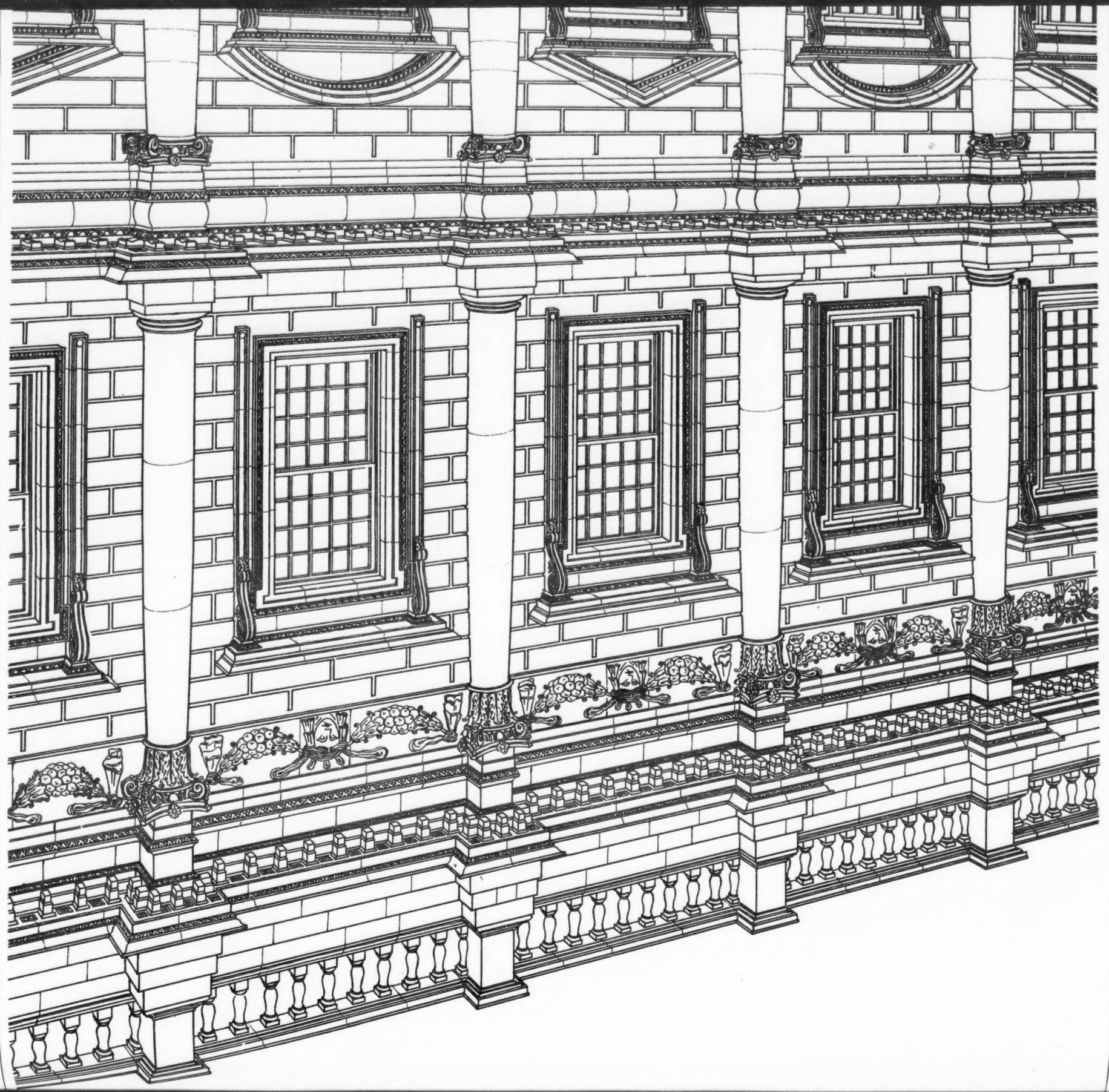

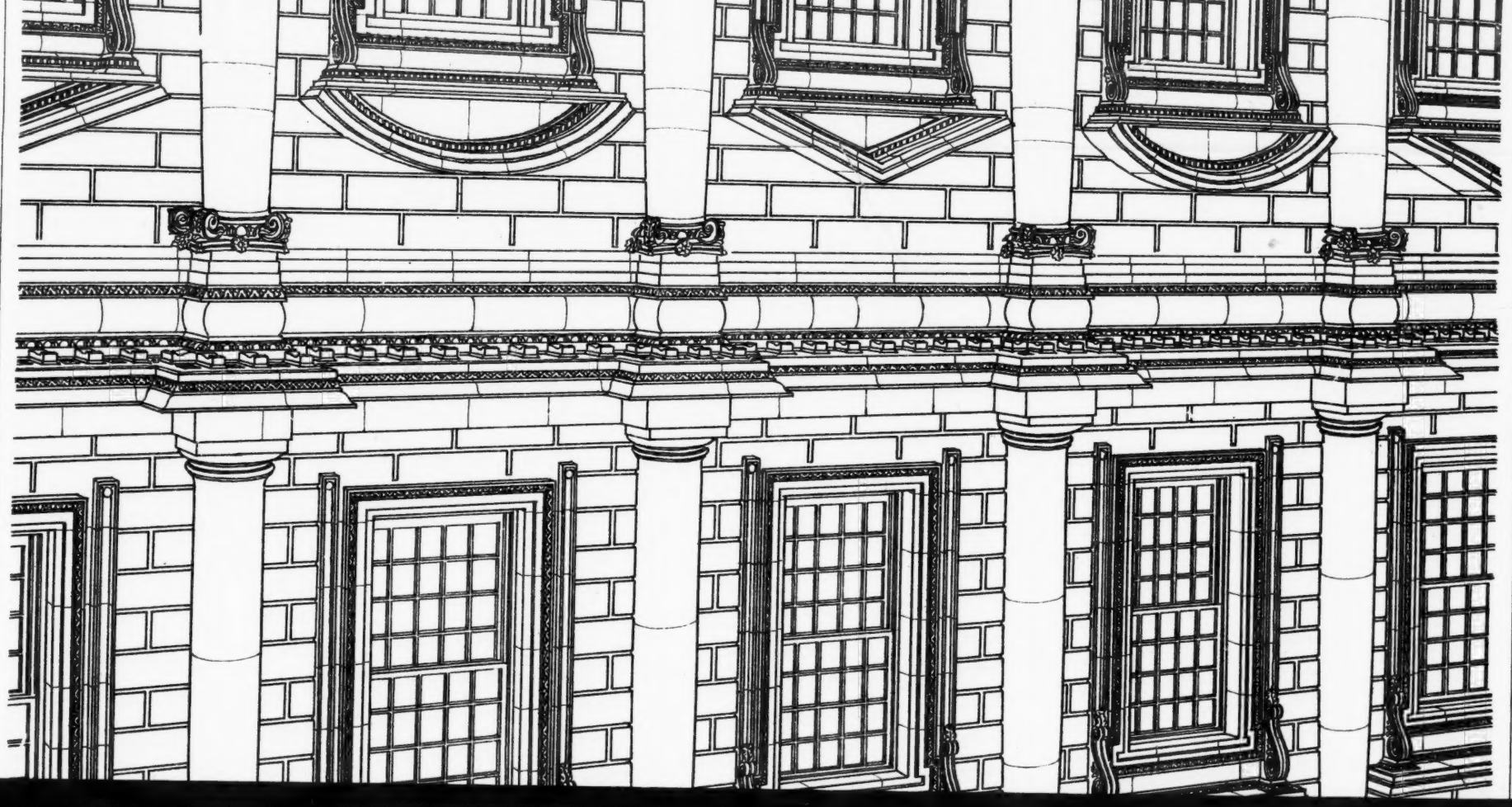

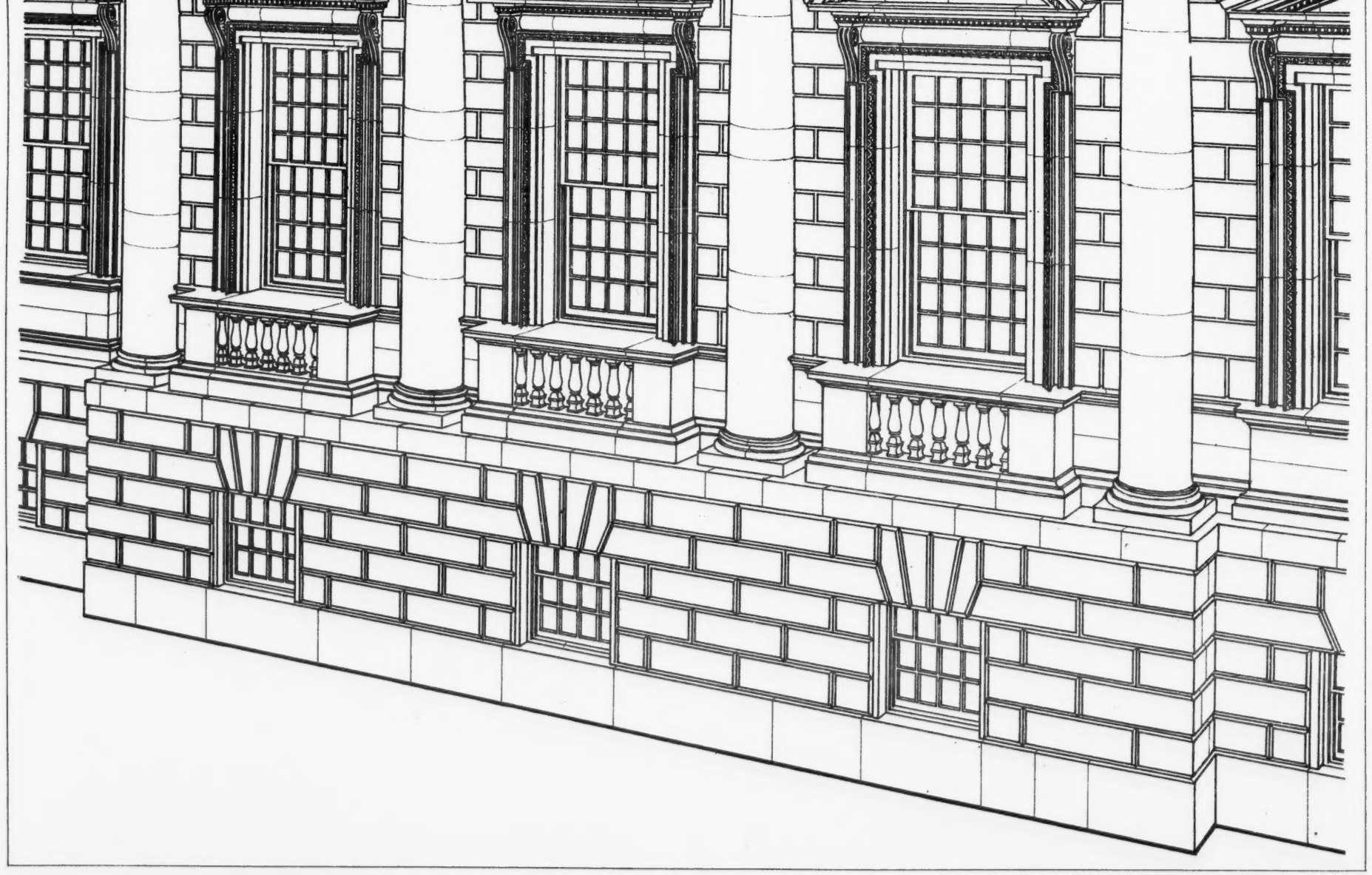

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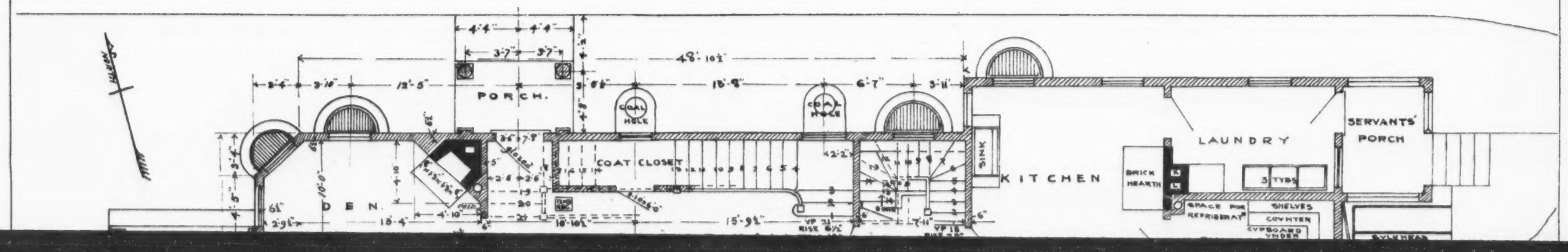
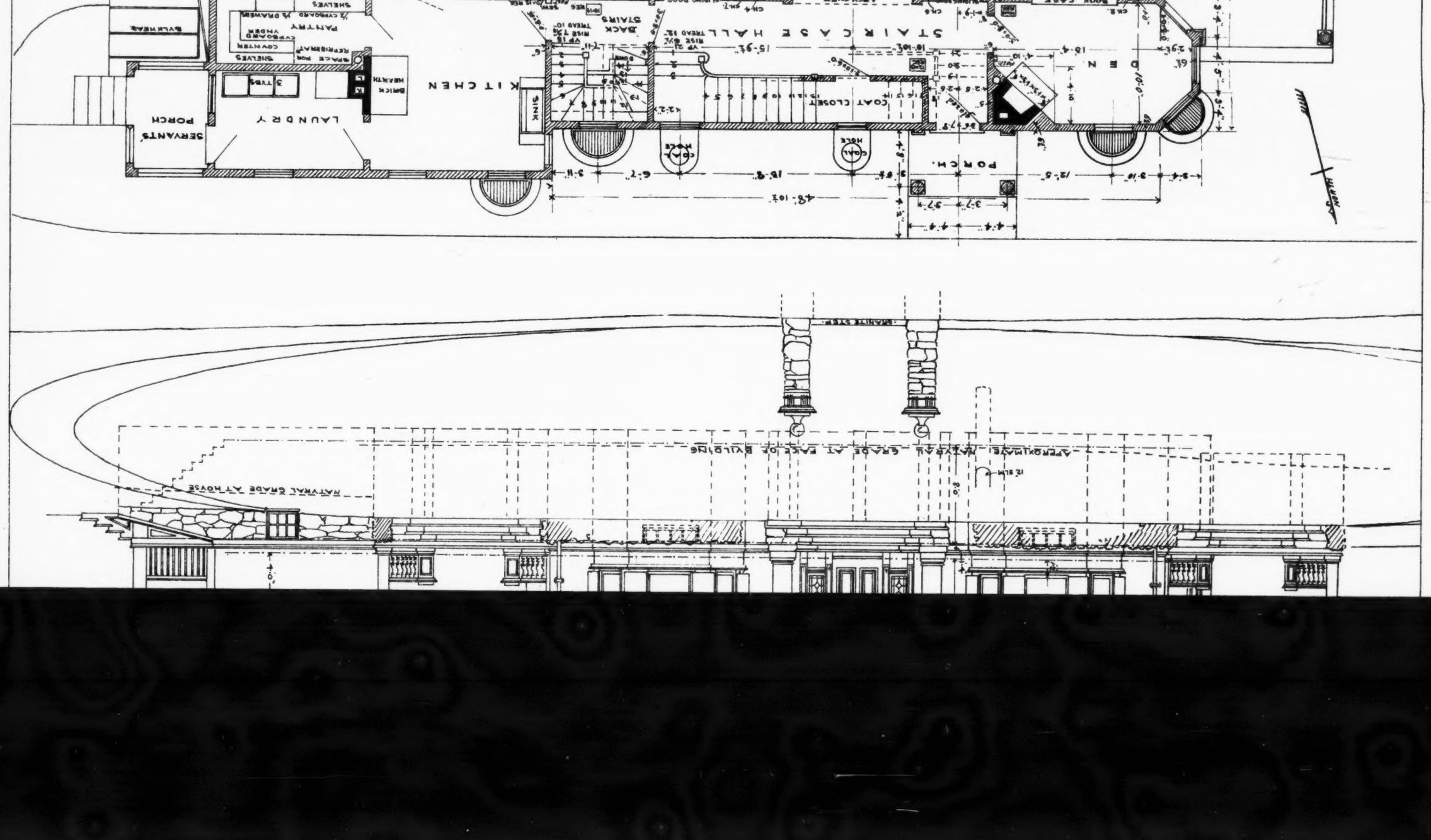
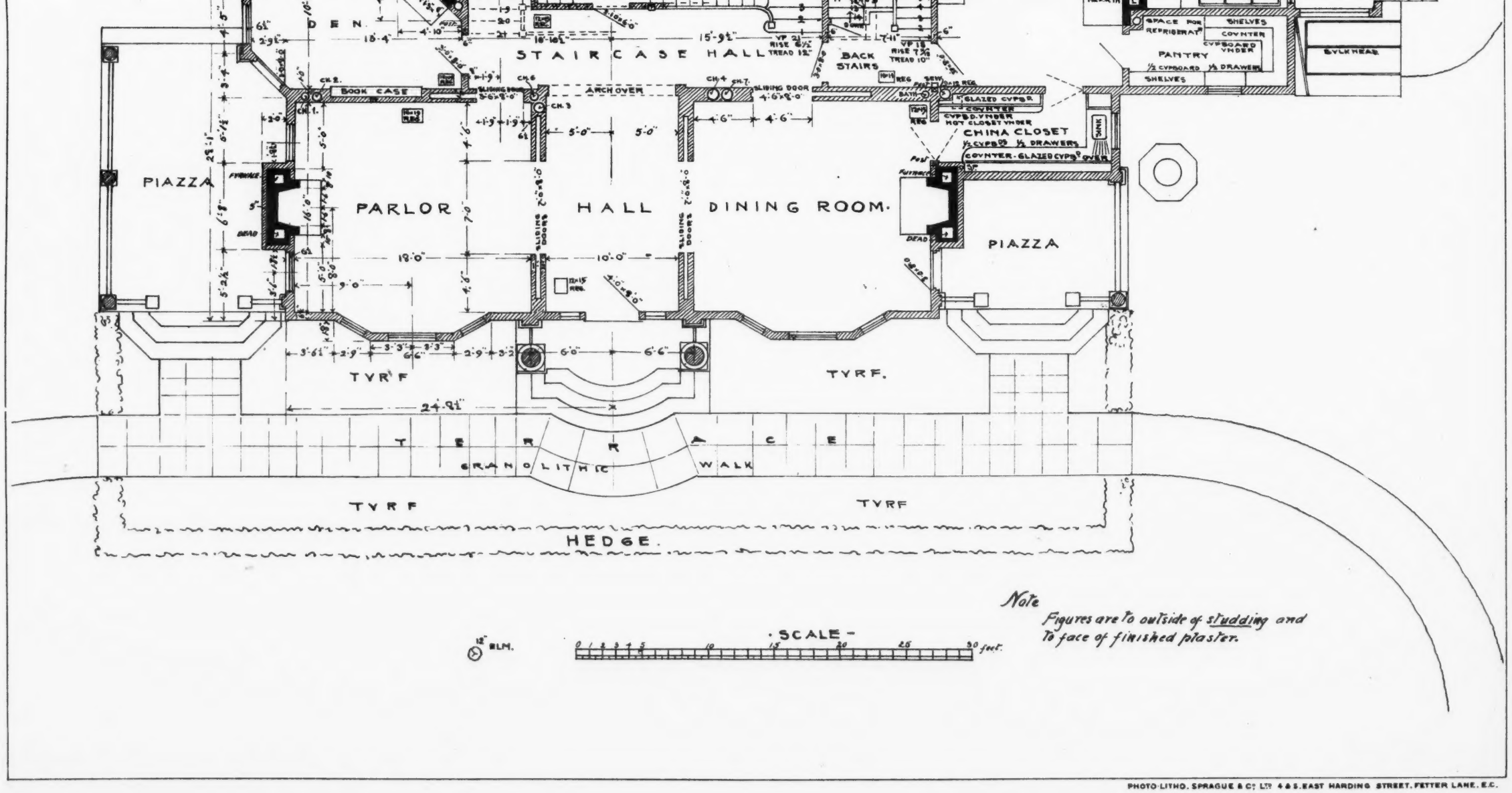
PERSPECTIVE DRAWING OF CENTRE PORTION OF BANQUETING HOUSE, WHITEHALL.—By Mr. George T. Smith.

Royal Academy Silver Medal for Perspective, 1900.

See Detail.
NATURAL GRADE AT HOUSE
APPROXIMATE NATURAL GRADE AT FACE OF BUILDING
GRANITE STEP


PORCH.
COAL HOLE
COAL HOLE
COAT CLOSET
DEN.
KITCHEN
SINK
LAUNDRY
SERVANTS' PORCH
BRICK HEARTH
3 TUBS
SHELVES
COUNTER
SPACE FOR REFRIGERAT
48'-10½"
15'-9½"
12'-5"
6'-7"
5'-11"
18'-4"
10'-10½"


KITCHEN
LAUNDRY
SERVANTS' PORCH
PANTRY
STAIR CASE HALL
DEN
PORCH
COAT CLOSET
BACK STAIRS
SINK
BRICK HEARTH
COAL HOLE
GRANITE BASE
NATURAL GRADE AT HOUSE
APPROXIMATE NATURAL GRADE AT FACE OF EXCAVATION



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PLAN AND ELEVATION OF AN AMERICAN FRAME HOUSE.

TO ILLUSTRATE PAPER BY MR. HARRY BUDDEN.